

2001 NW 19th Avenue, Suite 200 | Portland, OR 97209 | 971 544-2139 | www.maulfoster.com

July 25, 2014 Project No. 8128.01.08

Mr. Dana Bayuk Oregon Department of Environmental Quality 2020 SW 4th Avenue Portland, Oregon 97201-4987

Re: Revised Monitoring Wells WS-11 and WS-14 Abandonment Plan Siltronic Corporation 7200 NW Front Avenue, Portland, OR ECSI No. 183

#### Dear Dana:

On behalf of Siltronic Corporation (Siltronic), Maul Foster & Alongi, Inc. (MFA) has prepared this letter in response to direction from the Oregon Department of Environmental Quality (DEQ) to abandon nested monitoring well pairs WS-11 and WS-14 on the Siltronic property. This work plan has been revised from a previous version dated February 14, 2014 based on comments and direction provided by DEQ in an email dated June 25, 2014. Direction to abandon WS-14 was provided in DEQ's January 28, 2014 e-mail correspondence to Siltronic documenting a January 27, 2013 telephone conversation. Related submittals to DEQ include a well inspection video log for the WS-14 well pair dated April 25, 2014 and a response to DEQ's email (dated June 25, 2014) in a letter dated June 27, 2014. For reference, MFA's June 27, 2014 letter and DEQ's emails are included in Attachment A.

#### **BACKGROUND**

The nested monitoring well pairs WS-14 and WS-11 are located near the north (plant northwest) corner of the Siltronic property as shown in the attached figure. The wells were completed in October 2003 (WS-11) and July 2004 (WS-14) and constructed in accordance with then-approved DEQ and Oregon Water Resources Department (OWRD) design specifications of 2-inch diameter, flush threaded, Schedule 40 polyvinyl chloride (PVC) riser pipe; and 2-inch diameter, stainless steel wire wrapped 0.010-inch slot screen; and 2-inch diameter stainless steel sump.

Monitoring well WS-11-125 was completed to 125 feet bgs and monitoring well WS-11-161 was completed to 161 feet bgs, the same completion depths correlate with WS-14-125 and WS-14-161, respectively. The screened interval is 15 feet in primarily silt and sand for all four wells with a 1 foot sump at the bottom. The monitoring well construction logs are included in Attachment B.

The monitoring well pair WS-11 is identified by OWRD as well log ID "MULT 72126". For monitoring well pair WS-14, the OWRD log "MULT 73686" reports the well number as WS-

13, but the reported well number appears to be incorrect. The correct OWRD well log file for WS-14 is "MULT 73686." The OWRD well logs are included in Attachment C.

Per DEQ direction in their email dated January 28, 2014, a video inspection of the inside of monitoring wells WS-14-125 and WS-14-161 was completed to identify the potential causes for the presence of manufactured gas plant (MGP) dense, non-aqueous phase liquid (DNAPL) in WS-14-161. The video logs were submitted to DEQ on April 25, 2014 for review showing the joints in the WS-14 well pair to be intact. At that time, only the WS-14 well pair was scheduled to be abandoned. In the DEQ email dated June 25, 2014, DEQ directed Siltronic to also abandon well pair WS-11-125 and WS-11-161. The well inspection video logs for WS-14-125 and WS-14-161 are included as a DVD in Attachment D.

#### MONITORING WELL DECOMMISSIONING

Public and private utility-locating services and other information sources will be used to check for underground utilities before work begins. MFA will coordinate fieldwork to locate possible on-site utilities and piping or other subsurface obstructions. Prior to over-drilling, an air knife will be used to 10 feet below ground surface (bgs) around the wells to verify clearance from potential subsurface obstructions. For reference, site features near WS-11 and WS-14, including known utility lines and monitoring wells, are shown on the attached figure.

The monitoring well abandonment will be conducted in accordance with applicable regulations including Oregon Administrative Record (OAR) 690-240-0510, DEQ Guidance Document titled Groundwater Monitoring Well Drilling, Construction, and Decommissioning<sup>1</sup>, and previously approved protocols for abandoning monitoring wells at the NW Natural and Siltronic sites including an OWRD variance to use bentonite or organoclay/bentonite slurry if MGP DNAPL is encountered.

The abandonment procedures will include, but not be limited to, the following:

- Measuring the depth to water, depth to MGP DNAPL, potential product thickness, and depth to bottom of the monitoring well
- Using a sonic drilling rig, over-drilling the 2-inch-diameter PVC/steel monitoring well to the depth necessary to confirm the removal of well construction materials:
  - o 10-inch casing will be used from 0 to approximately 126 feet bgs
  - o 8-inch casing will be used from 126 feet bgs to 170 feet bgs (approximately)
- Documenting the presence and approximate depth of MGP DNAPL, to the extent practicable

DEQ. 1992. Groundwater Monitoring Well Drilling, Construction, and Decommissioning. Technical Guidance. Oregon Department of Environmental Quality. August 24.

- Confirmation that monitoring well materials have been removed
- Sealing the borehole by backfilling with bentonite or organoclay/bentonite slurry with an approved variance from OWRD (in the event that MGP DNAPL is encountered)
- Surface completion to match the surrounding area

Monitoring well construction materials, soil, decontamination liquid and groundwater generated during the well abandonment will be contained in 55-gallon drums and staged onsite. The material will be properly disposed of off-site based on waste characterization sampling results.

#### REPORTING

After the monitoring well abandonment activities have been completed, MFA will submit a monitoring well abandonment report to DEQ that summarizes the completion of the monitoring well abandonment.

#### **SCHEDULE**

MFA is prepared to begin work immediately upon DEQ review and approval of the proposed approach, subject to availability of subcontractors.

Sincerely,

Maul Foster & Alongi, Inc.

Kerry-Cathlin Gallagher

Project Scientist

James G.D. Peale, RG Principal Hydrogeologist

Attachment: Figure

Attachment A—Correspondence

Attachment B—Monitoring Well Completion Logs

Attachment C—OWRD Well Logs

Attachment D—Video Log of WS-14-125 and WS-14-161 (DVD)

cc: Myron Burr, Siltronic Corporation

Alan Gladstone, Davis Rothwell Earle & Xochihua, P.C.

Brian Church, Davis Rothwell Earle & Xochihua, P.C.

William Earle, Davis Rothwell Earle & Xochihua, P.C.

Chris Reive, Jordan Ramis

Keith Johnson, DEQ
Tom Gainer, DEQ
Henning Larsen, DEQ
Matt McClincy, DEQ
Kristopher Byrd, OWRD
Sean Sheldrake, EPA
Lance Peterson, CDM
Scott Coffey, CDM
Bob Wyatt, NW Natural
Patty Dost, Pearl Legal Group LLC
John Edwards, Anchor QEA LLC
John Renda, Anchor QEA LLC
Rob Ede, Hahn and Associates, Inc.

### **FIGURE**





Source: Aerial photograph obtained from Esri ArcGIS Online.

Note:

Locations are approximate and shown for reference only.



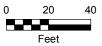
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

### Legend

- NW Natural Station
- Siltronic Monitoring Well
- TarGOST Boring
- Utility Line (Siltronic)
- Siltronic Tax Lot

# Figure Monitoring Well WS-14 and WS-11 Locations

Siltronic Corporation Portland, Oregon





### ATTACHMENT A

CORRESPONDENCE



#### Kerry Gallagher

From: BAYUK Dana <BAYUK.Dana@deq.state.or.us>

Sent: Tuesday, January 28, 2014 9:19 AM

To: James Peale

Cc: Burr, Myron; Gladstone, Alan; Church, Brian (BCHURCH@davisrothwell.com); Chris

Reive (Chris.Reive@jordanramis.com); Earle, William G. (WEARLE@davisrothwell.com);

Kerry Gallagher; BYRD Kristopher R; LARSEN Henning

RE: Siltronic - Conversation Confirmation Subject:

Good morning James.

This e-mail confirms that during our telephone conversation yesterday I informed you that Siltronic Corporation should prepare a plan for abandoning monitoring well WS-14-161. The screen and sand pack interval of this monitoring well penetrates through the "deep aquitard" identified beneath the Siltronic property. The appearance of dense-non aqueous phase liquid (DNAPL) in the monitoring well indicates the installation is acting as a pathway for contamination to migrate vertically downward through the deep aguitard into deeper intervals of the Alluvium water-bearing zone.

As I indicated during yesterday's call, based on the information summarized above DEQ has determined that abandonment of WS-14-161 is required under the TCE Order (DEQ No. VC-NWR-03-16). Abandonment of WS-14-161 should be conducted consistent with OAR-690-240 and previously approved protocols for abandoning monitoring wells at the Gasco and Siltronic sites (e.g., use of organoclay-bentonite sealant).

Previous work at the adjoining Gasco Site identified potential causes for DNAPL to appear in monitoring wells including: 1)migration of DNAPL to the monitoring well location; and/or 2) vertical migration of DNAPL down the borehole due to failure of the monitoring well seal. Siltronic should assess the cause of DNAPL appearance in WS-14-161 by videoing the inside of the 2-inch monitoring well casing and screen prior to abandonment and, to the extent practicable documenting visual evidence of the depth of DNAPL occurrence during abandonment.

As indicated in your e-mail, Siltronic should submit the abandonment plan for WS-14-161 on or before February 14, 2014.

Please don't hesitate to contact me with questions regarding this e-mail.

Mr. Dana Bayuk, Project Manager NW Region Cleanup & Site Assessment Section Oregon Department of Environmental Quality 2020 SW 4th Avenue, Suite 400 Portland, OR 97201

E-mail: bayuk.dana@deq.state.or.us

Phone: 503-229-5543 FAX: 503-229-6899

Please visit our website at http://www.oregon.gov/DEQ/



please consider the environment before printing this email

From: James Peale [mailto:jpeale@maulfoster.com]

**Sent:** Monday, January 27, 2014 4:50 PM

To: BAYUK Dana

Cc: Burr, Myron; Gladstone, Alan; Church, Brian (BCHURCH@davisrothwell.com); Chris Reive (Chris.Reive@jordanramis.com); Earle, William G. (WEARLE@davisrothwell.com); Kerry Gallagher

Subject: Siltronic - Conversation Confirmation

#### Dana -

This email is provided as a continuation to our conversation of this morning. For the purposes of documentation, Siltronic requires DEQ's email confirmation that DEQ has directed Siltronic to submit a workplan for the abandonment of nested wells WS-14-125 and WS-14-161. The workplan is due February 14, 2014. Please also confirm that the workplan should describe abandonment consistent with WRD regulations (e.g., OAR 690-220 Abandonment of Wells).

MFA is prepared to submit the workplan consistent with these requirements. Please note that if the workplan is approved, Siltronic will require written direction from DEQ in order to proceed with the abandonment.

Thanks in advance, Dana.

jp

#### JAMES G.D. PEALE RG, LHG | MAUL FOSTER ALONGI

d. 503 501 5218 | p. 971 544 2139 | c. 503 449 9576 | f. 971 544 2140 | <u>www.maulfoster.com</u> 2001 NW 19th Avenue, Suite 200, Portland, OR 97209

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#### **Kerry Gallagher**

From: BAYUK Dana <BAYUK.Dana@deq.state.or.us>

**Sent:** Wednesday, June 25, 2014 4:38 PM **To:** 'Burr, Myron (Myron.Burr@siltronic.com)'

**Cc:** 'Gladstone, Alan (AGLADSTONE@davisrothwell.com)'; James Peale; Kerry Gallagher;

Bob Wyatt; Patty Dost; 'John Edwards (jedwards@anchorgea.com)'; 'Ben Hung'; John

Renda; Rob Ede; 'Sheldrake, Sean'; Mullin, Jeanette; 'Peterson, Lance

(PetersonLE@cdmsmith.com)'; Coffey, Scott; BYRD Kristopher R; JOHNSON Keith;

GAINER Tom; LARSEN Henning; MCCLINCY Matt

Subject: RE: Siltronic: Monitoring Well WS-14 Abandonment WP

#### Good afternoon Myron.

Consistent with DEQ's April 10, 2014 e-mail (see below), Siltronic Corporation (Siltronic) completed video logging of monitoring wells WS-14-125 and WS-14-161 on April 14, 2014. DEQ reviewed the video logs and concludes that dense non-aqueous phase liquids (DNAPLs) are entering the monitoring well screens and sand-packed intervals of both installations. These two monitoring wells are constructed in a single borehole and together are designated "WS-14-125/161."

In addition, as indicated in our May 20, 2014 letter commenting on the Phase 1-Step 4 Report (see footnote), DEQ concludes the screen and sand-packed intervals of monitoring wells WS-11-161 and WS-14-161 penetrate the deep aquitard and hydraulically connect the upper lower Alluvium water-bearing zone (WBZ) and the deep lower Alluvium WBZ.

Monitoring well WS-11-161 is collocated with WS-11-125 in a single borehole and the two wells together are designated "WS-11-125/161." Groundwater contamination is documented in both of these monitoring wells.

Based on the information summarized above, DEQ further concludes that:

- Monitoring wells WS-14-125 and WS-14-161 represent potential pathways for DNAPLs to migrate vertically downward into deeper intervals of the upper lower Alluvium WBZ and deep lower Alluvium WBZ; and
- Monitoring well WS-11-161 represents a potential pathway for groundwater contamination in the upper lower Alluvium WBZ to migrate vertically downward into the deep lower Alluvium WBZ.

DEQ requires that WS-11-125/161 and WS-14-125/161 be permanently abandoned through over drilling and removal consistent with OAR 690-290-0510. Siltronic should prepare and submit a work plan for this purpose for DEQ's review within 30-days of receiving this e-mail.

DEQ acknowledges and appreciates the video logs of WS-14-125/161. The logs were very useful for determining the status of the installations. Please don't hesitate to contact me with questions regarding this e-mail.

#### Dana

Mr. Dana Bayuk, Project Manager
NW Region Cleanup & Site Assessment Section
Oregon Department of Environmental Quality
2020 SW 4th Avenue, Suite 400
Portland, OR 97201

E-mail: bayuk.dana@deq.state.or.us

Phone: 503-229-5543 FAX: 503-229-6899

Please visit our website at <a href="http://www.oregon.gov/DEQ/">http://www.oregon.gov/DEQ/</a>

Footnote, Anchor QEA, LLC, 2014, "Data Report: Groundwater Source Control Extraction System Test - Phase 1 Step 4 – NW Natural Gasco Site," April 10, a report prepared for NW Natural.

From: BAYUK Dana

Sent: Thursday, April 10, 2014 5:41 PM

To: 'Kerry Gallagher'

Cc: James Peale; Burr, Myron (Myron.Burr@siltronic.com); Gladstone, Alan (AGLADSTONE@davisrothwell.com); Church,

Brian (BCHURCH@davisrothwell.com); Earle, William G. (WEARLE@davisrothwell.com); Chris Reive

(Chris.Reive@jordanramis.com); JOHNSON Keith; koch.kristine@epa.gov; Sheldrake.Sean@epamail.epa.gov;

Fuentes.Rene@epamail.epa.gov; Peterson, Lance (PetersonLE@cdmsmith.com); pdost@pearllegalgroup.com; John

Edwards (jedwards@anchorqea.com); Carl Stivers (cstivers@anchorqea.com); rjw@nwnatural.com; Rob Ede

(robe@hahneny.com); BYRD Kristopher R; GAINER Tom; LARSEN Henning; MCCLINCY Matt Subject: RE: Siltronic: Monitoring Well WS-14 Abandonment WP

Good afternoon Kerry.

DEQ reviewed the "Monitoring Well WS-14 Abandonment Plan, Siltronic Corporation, 7200 NW Front Avenue, Portland, OR - ECSI No. 183" dated February 14, 2014 (Abandonment Plan). As we discussed by telephone the Abandonment Plan provides insufficient information regarding decommissioning procedures, particularly with respect to over-drilling and removing monitoring well construction materials.

As requested by DEQ, the Abandonment Plan includes a task to video log the WS-14-125/161 monitoring wells before they are decommissioned. During telephone discussions we concluded the video log could provide useful information for developing the approach to decommissioning the two installations. Based on this conclusion, DEQ verbally approved Siltronic moving forward with video logging. This e-mail provides DEQ's written approval for Siltronic to proceed with the video logs of WS-14-125/161.

DEQ understands video logging will be conducted on April 11, 2014. DEQ requests that three copies of the log be provided on disc for our information and use. This e-mail also acknowledges that you notified me of the work and schedule during our phone discussion on April 3<sup>rd</sup>.

Please feel free to contact me with questions regarding this e-mail.

#### Dana

Mr. Dana Bayuk, Project Manager NW Region Cleanup & Site Assessment Section Oregon Department of Environmental Quality 2020 SW 4th Avenue, Suite 400 Portland, OR 97201

E-mail: bayuk.dana@deq.state.or.us

Phone: 503-229-5543 FAX: 503-229-6899

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From: Kerry Gallagher [mailto:kgallagher@maulfoster.com]

Sent: Friday, February 14, 2014 3:58 PM

To: BAYUK Dana

Cc: James Peale; Burr, Myron (Myron.Burr@siltronic.com); Gladstone, Alan (AGLADSTONE@davisrothwell.com); Church,

Brian (BCHURCH@davisrothwell.com); Earle, William G. (WEARLE@davisrothwell.com); Chris Reive (Chris.Reive@jordanramis.com); JOHNSON Keith; koch.kristine@epa.gov; Sheldrake.Sean@epamail.epa.gov; Fuentes.Rene@epamail.epa.gov; Peterson, Lance (PetersonLE@cdmsmith.com); pdost@pearllegalgroup.com; John Edwards (jedwards@anchorgea.com); Carl Stivers (cstivers@anchorgea.com); rjw@nwnatural.com; Rob Ede

(robe@hahnenv.com); GAINER Tom; LARSEN Henning; MCCLINCY Matt

Subject: Siltronic: Monitoring Well WS-14 Abandonment WP

Dana,

As requested, please find the attached Monitoring Well WS-14 Abandonment Work Plan for your review and approval. The required hard copies of this submittal will follow by mail.

Please call or email if you have any questions. Thank you,

#### KERRY-CATHLIN GALLAGHER | MAUL FOSTER & ALONGI, INC.

direct. 503 501 5229 | main office. 971 544 2139 | cell. 503 896 0255 | fax. 971 544 2140 | <u>www.maulfoster.com</u> 2001 NW 19th Avenue, Suite 200, Portland, Oregon 97209

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Project No. 8128.01.08

Mr. Dana Bayuk

Oregon Department of Environmental Quality
2020 SW 4th Avenue

Portland, Oregon 97201-4987

Re: WS-11 and WS-14 Well Abandonment—Response to DEQ email dated 6/25/14 Siltronic Corporation 7200 NW Front Avenue, Portland, OR ECSI #183

#### Dear Dana:

June 27, 2014

We are in receipt of your email (attached to this letter) providing direction regarding Oregon Department of Environmental Quality's (DEQ's) requirement to submit a workplan to abandon the WS-14 and WS-11 installations (which collectively include wells WS-14-125, WS-14-161, WS-11-125, and WS-11-161). For clarification, Maul Foster & Alongi, Inc. (MFA) submitted a workplan (dated February 14, 2014) for abandonment of WS-14; we will revise that document and resubmit.

In the email, DEQ concluded that the WS-14 and WS-11 wells represented potential pathways for contamination (either in the dissolved phase or as manufactured gas plant [MGP] dense non-aqueous phase liquid [DNAPL]) to migrate from the upper lower alluvium, or ULA, to the deeper lower alluvium (DLA). While Siltronic does not oppose or object to the instruction to abandon the subject installations, we offer the following information:

1) DEQ and Northwest Natural (NWN) have developed a conceptual site model (CSM) that posits an aquitard separating the ULA and DLA (as shown on Figure 2-3c<sup>1</sup>, which is attached for reference). That putative aquitard supposedly influences groundwater elevations measured during the hydraulic control and containment (HC/C) system testing phases, and has been incorporated into the HC/C system model to facilitate corroboration of the measured and predicted results. However, it has not been demonstrated that this aquitard is laterally continuous such that it prevents downward flow of groundwater, or that it results in complete hydraulic separation (characteristic of an aquiclude) of the alluvium water bearing zone (AWBZ) into distinct subunits. In contrast, data collected during the remedial investigations of the Siltronic site demonstrate that the DLA is already impacted by

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<sup>&</sup>lt;sup>1</sup> The figure notes that geologic contacts are inferred between borings. The geologic contacts inferred for the aquitard are extended between WS-14 and WS-11 (approximately 150 feet distant) with no intermediate borings shown. The aquitard contacts are further extended laterally toward the MW-5 location, again with no intermediate borings shown. There is no lithologic data presented to support the extent or continuity of the aquitard.

Dana Bayuk June 27, 2014 Page 2

chemicals (e.g., methyl tert-butyl ether and dichlorobenzene isomers) released to the surface at locations upgradient of the HC/C testing area.

- 2) Site data from the Siltronic and Gasco properties confirm that the silt and/or sandy silt layers (with lithology characteristic of an aquitard) present little if any barrier to downward migration of MGP DNAPL. MGP DNAPL is observed entering the well screen of WS-14-125, and is therefore present in the ULA in spite of multiple overlying fine grained layers. MGP DNAPL was observed entering near the bottom of the well screen in WS-14-161 at a depth of approximately 157 feet bgs (shown on the annotated Figure 2-3c, attached). This observation, documented by the video required by DEQ, indicates that MGP DNAPL is already present beneath the putative aquitard (i.e., is present in the DLA) likely having migrated downward independent of the natural lithology or the well installation. That observation is not inconsistent with the site-specific data that confirm that finer-grained layers do not prevent downward migration of MGP DNAPL.
- 3) The design, methods, and equipment for the construction of WS-11 and WS-14 were reviewed and approved by DEQ and the Oregon Water Resources Department (WRD). The video data indicate that the integrity of the WS-14 wells has not been compromised.

Again, Siltronic does not dispute DEQ's instruction to abandon the wells, and as stated above will submit a workplan consistent with the email. Siltronic strongly disagrees with the implication, intentional or otherwise, that wells installed with DEQ and WRD approval have accelerated or otherwise exacerbated vertical migration of contamination beyond the existing conditions at the site. Please contact me if you have any questions or concerns regarding this letter.

Sincerely,

Maul Foster & Alongi, Inc.

Kerry-Cathlin Gallagher

Project Scientist

James G.D. Peale, RG Principal Hydrogeologist

Attachments: DEQ email dated 6/25/14

Figure

Dana Bayuk June 27, 2014 Page 3

cc (e-mail only): Myron Burr, Siltronic Corporation

Alan Gladstone, Brian Church, and William Earle; Davis Rothwell Earle & Xochihua

Chris Reive, Jordan Ramis

Keith Johnson, DEQ

Tom Gainer, DEQ

Henning Larsen, DEQ

Matt McClincy, DEQ

Kristine Koch, EPA

Sean Sheldrake, EPA

Rene Fuentes, EPA

Lance Peterson, CDM

Bob Wyatt, NW Natural

Patty Dost, Pearl Legal Group LLC

John Edwards, Anchor QEA LLC

Carl Stivers, Anchor QEA LLC

Rob Ede, Hahn and Associates, Inc.

## **ATTACHMENT**

DEQ EMAIL DATED 6/25/14



#### **James Peale**

From: BAYUK Dana <BAYUK.Dana@deq.state.or.us>

**Sent:** Wednesday, June 25, 2014 4:38 PM **To:** 'Burr, Myron (Myron.Burr@siltronic.com)'

Cc: 'Gladstone, Alan (AGLADSTONE@davisrothwell.com)'; James Peale; Kerry Gallagher;

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GAINER Tom; LARSEN Henning; MCCLINCY Matt

Subject: RE: Siltronic: Monitoring Well WS-14 Abandonment WP

#### Good afternoon Myron.

Consistent with DEQ's April 10, 2014 e-mail (see below), Siltronic Corporation (Siltronic) completed video logging of monitoring wells WS-14-125 and WS-14-161 on April 14, 2014. DEQ reviewed the video logs and concludes that dense non-aqueous phase liquids (DNAPLs) are entering the monitoring well screens and sand-packed intervals of both installations. These two monitoring wells are constructed in a single borehole and together are designated "WS-14-125/161."

In addition, as indicated in our May 20, 2014 letter commenting on the Phase 1-Step 4 Report (see footnote), DEQ concludes the screen and sand-packed intervals of monitoring wells WS-11-161 and WS-14-161 penetrate the deep aquitard and hydraulically connect the upper lower Alluvium water-bearing zone (WBZ) and the deep lower Alluvium WBZ.

Monitoring well WS-11-161 is collocated with WS-11-125 in a single borehole and the two wells together are designated "WS-11-125/161." Groundwater contamination is documented in both of these monitoring wells.

Based on the information summarized above, DEQ further concludes that:

- Monitoring wells WS-14-125 and WS-14-161 represent potential pathways for DNAPLs to migrate vertically downward into deeper intervals of the upper lower Alluvium WBZ and deep lower Alluvium WBZ; and
- Monitoring well WS-11-161 represents a potential pathway for groundwater contamination in the upper lower Alluvium WBZ to migrate vertically downward into the deep lower Alluvium WBZ.

DEQ requires that WS-11-125/161 and WS-14-125/161 be permanently abandoned through over drilling and removal consistent with OAR 690-290-0510. Siltronic should prepare and submit a work plan for this purpose for DEQ's review within 30-days of receiving this e-mail.

DEQ acknowledges and appreciates the video logs of WS-14-125/161. The logs were very useful for determining the status of the installations. Please don't hesitate to contact me with questions regarding this e-mail.

#### Dana

Mr. Dana Bayuk, Project Manager NW Region Cleanup & Site Assessment Section Oregon Department of Environmental Quality 2020 SW 4th Avenue, Suite 400 Portland, OR 97201

E-mail: <u>bayuk.dana@deq.state.or.us</u>
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Please visit our website at <a href="http://www.oregon.gov/DEQ/">http://www.oregon.gov/DEQ/</a>

Footnote, Anchor QEA, LLC, 2014, "Data Report: Groundwater Source Control Extraction System Test - Phase 1 Step 4 – NW Natural Gasco Site," April 10, a report prepared for NW Natural.

From: BAYUK Dana

Sent: Thursday, April 10, 2014 5:41 PM

To: 'Kerry Gallagher'

Cc: James Peale; Burr, Myron (Myron.Burr@siltronic.com); Gladstone, Alan (AGLADSTONE@davisrothwell.com); Church,

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(robe@hahneny.com); BYRD Kristopher R; GAINER Tom; LARSEN Henning; MCCLINCY Matt

Subject: RE: Siltronic: Monitoring Well WS-14 Abandonment WP

Good afternoon Kerry.

DEQ reviewed the "Monitoring Well WS-14 Abandonment Plan, Siltronic Corporation, 7200 NW Front Avenue, Portland, OR - ECSI No. 183" dated February 14, 2014 (Abandonment Plan). As we discussed by telephone the Abandonment Plan provides insufficient information regarding decommissioning procedures, particularly with respect to over-drilling and removing monitoring well construction materials.

As requested by DEQ, the Abandonment Plan includes a task to video log the WS-14-125/161 monitoring wells before they are decommissioned. During telephone discussions we concluded the video log could provide useful information for developing the approach to decommissioning the two installations. Based on this conclusion, DEQ verbally approved Siltronic moving forward with video logging. This e-mail provides DEQ's written approval for Siltronic to proceed with the video logs of WS-14-125/161.

DEQ understands video logging will be conducted on April 11, 2014. DEQ requests that three copies of the log be provided on disc for our information and use. This e-mail also acknowledges that you notified me of the work and schedule during our phone discussion on April 3<sup>rd</sup>.

Please feel free to contact me with questions regarding this e-mail.

#### Dana

Mr. Dana Bayuk, Project Manager NW Region Cleanup & Site Assessment Section Oregon Department of Environmental Quality 2020 SW 4th Avenue, Suite 400 Portland, OR 97201

E-mail: bayuk.dana@deq.state.or.us

Phone: 503-229-5543 FAX: 503-229-6899

Please visit our website at <a href="http://www.oregon.gov/DEQ/">http://www.oregon.gov/DEQ/</a>



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From: Kerry Gallagher [mailto:kgallagher@maulfoster.com]

Sent: Friday, February 14, 2014 3:58 PM

To: BAYUK Dana

Cc: James Peale; Burr, Myron (Myron.Burr@siltronic.com); Gladstone, Alan (AGLADSTONE@davisrothwell.com); Church,

Brian (<u>BCHURCH@davisrothwell.com</u>); Earle, William G. (<u>WEARLE@davisrothwell.com</u>); Chris Reive (<u>Chris.Reive@jordanramis.com</u>); JOHNSON Keith; <u>koch.kristine@epa.gov</u>; <u>Sheldrake.Sean@epamail.epa.gov</u>; <u>Fuentes.Rene@epamail.epa.gov</u>; Peterson, Lance (<u>PetersonLE@cdmsmith.com</u>); <u>pdost@pearllegalgroup.com</u>; John Edwards (jedwards@anchorgea.com); Carl Stivers (cstivers@anchorgea.com); rjw@nwnatural.com; Rob Ede

(robe@hahnenv.com); GAINER Tom; LARSEN Henning; MCCLINCY Matt

Subject: Siltronic: Monitoring Well WS-14 Abandonment WP

Dana,

As requested, please find the attached Monitoring Well WS-14 Abandonment Work Plan for your review and approval. The required hard copies of this submittal will follow by mail.

Please call or email if you have any questions. Thank you,

#### KERRY-CATHLIN GALLAGHER | MAUL FOSTER & ALONGI, INC.

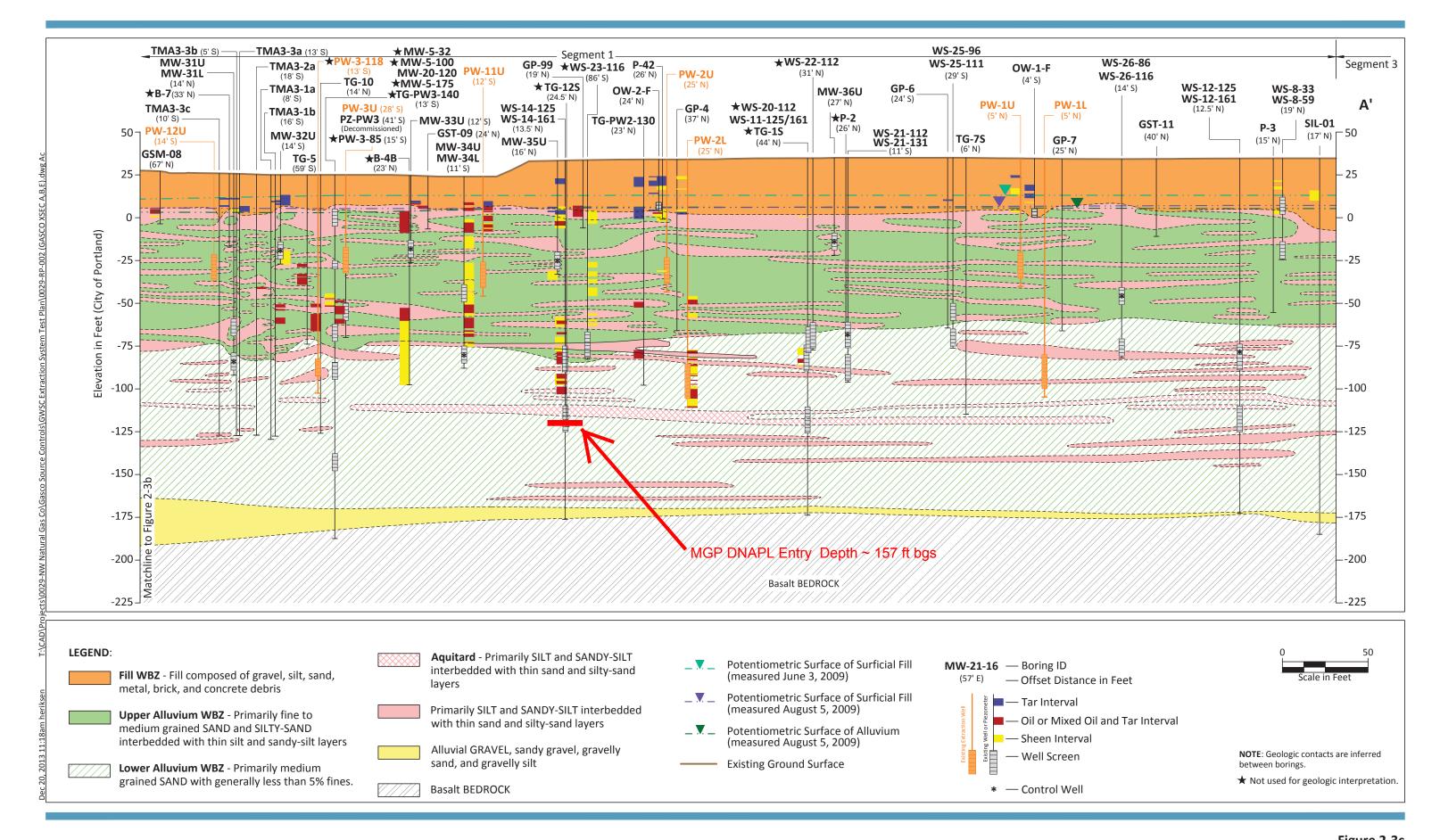
direct. 503 501 5229 | main office. 971 544 2139 | cell. 503 896 0255 | fax. 971 544 2140 | <u>www.maulfoster.com</u> 2001 NW 19th Avenue, Suite 200, Portland, Oregon 97209

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### **FIGURE**







### ATTACHMENT B

MONITORING WELL COMPLETION LOGS



Maul Foster 8	& Alongi, Inc.	Project I <b>8128.</b> 0		Well Number WS-11	Sheet 1 of 11
Project Name Project Location Start/End Date Driller/Equipment Geologist/Engineer Sample Method	Wacker Siltronic 7200 Northwest 9/21/03 to 10/3/0 Prosonic Corpor Tony Silva 4x6 Core Barrel	Corporation Front Avenue, Por 3		TOC Elevation (feet NG	VD) 31.8500
	> 5 S	ample Data	. 0	Soil Description	
Debth Details  Well Details	Interval Percent Recovery Collection Method	Name (Type)	Blows/6" Lithologic Column		
1	100% CB	PID = 0.0		0.0 to 0.5 feet: TOPSOIL, GRAVELLY SILT non plastic; 30% gravel, medium, suban rootlets, woody debris; moist. 0.5 to 1.5 feet: SANDY GRAVEL (GP); bro medium; 60% gravel, fine, subangular to 1.5 to 7.0 feet: SAND (SP); light brown; 95% to medium, subrounded; moist. (Fill)	gular; 50% organic debris, wnish-gray; 40% sand, fine to o subrounded; dry. (Fill)
*\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	- 100% CB	PID = 0.0		to modularly considerated made (1 m)	
6		PID = 0.0			
7 8 9	- 100% CB	PID = 0.0		7.0 to 12.0 feet: SAND (SP); dark brown; 10 fines and gravels; moist. (Fill)	00% sand, fine to medium; trace
10		PID = 0.0			
13 14		PID = 0.0		12.0 to 16.0 feet: WOOD; core of wood; sta naphthalene or petroleum like odor. (Fil	
15	- 4000	PID = 0.0			
17	100% CB			16.0 to 17.0 feet: SAND (SP); dark brown; fines and gravels; moist. Possibly drilling the hole from the wood. (Fill)  17.0 to 18.0 feet: WOOD; core of wood; stanaphthalene or petroleum like odor. (Fill)	g sluff from trying to clean out
19	- 100% CB	PID = 0.0		18.0 to 19.0 feet: SAND (SP); light brown, m trace fines and gravels; moist. (Fill)	oist; 100% sand, fine to mediun
20		PID = 0.0		19.0 to 21.0 feet: SANDY SILT (ML-SM); li 50% sand, fine to medium; dry. Britle,	
			1 18: L' K' 1.8' ]	reading in parts per million. 3. GW=groundwater sample	de de edenardo de la francia de la composición del composición de la composición de la composición del composición de la composición del composición de la composición del c

22 23 24 25 26 27 28 29 30 31 32 31 32 33 34 35 37	Well Number Sheet WS-11 2 of 1	
21 22 23 24 25 26 27 28 29 30 31 32 31 32 33 40 5 7 90% CB PID = 0.0 PID =	Soil Description	
29 30 31 32 31 32 33 34 35 36 37 - 90% CB PID = 0.0  PID = 0.0  PID = 0.0  PID = 0.0	·	
29 30 31 32 PID = 13.5 PID = 7.0 34 35 PID = 0.0	21.0 to 27.0 feet: SAND (SP); reddish-brown; 90% sand, fine to gravel, fine to medium, subrounded; dry to moist. (Fill)	nedium; 10
29 30 31 32 31 32 33 34 35 36 37 - 90% CB PID = 0.0  PID = 0.0  PID = 0.0  PID = 0.0	@ 22.5 feet: 0.2-foot layer color change to light gray. Steel de steel shackle from a padlock.	ebris, possib
29 30 31 32 33 34 35 36 37 - 90% CB PID = 0.0		
29 30 31 32 33 34 35 36 37 - 90% CB PID = 0.0		
29 30 31 32 32 33 34 35 36 37 40 PID = 0.0	27.0 to 28.0 feet NO RECOVERY.	
30 31 32 33 34 35 36 37 39 40 PID = 0.0	28.0 to 31.5 feet: SAND (SP); dark gray; 95% sand, fine to med gravels, subrounded; wet. (Fill)	dium; 5%
## PID = 13.5  ## PID = 7.0  ## PID = 0.0  ## PID = 0.0  ## PID = 0.0		
33 PID = 13.5 PID = 7.0  34 35 PID = 0.0  36 37 PID = 0.0  PID = 0.0	37.5 to 37.0 feet: SILTY SAND to SANDY SILT (SM-ML); dark	gray; 50%
34 35 36 37 38 39 40	fines, non plastic; 50% sand, fine; organic debris, roots; m @ 31.5 feet: 0.2-foot thick layer of staining, sheen. Petroleum	oist to wet.
36 37 38 39 40		
38 PID = 0.0 38 40		
39 40	37.0 to 38.0 feet NO RECOVERY.	
	38.0 to 41.0 feet: SANDY SILT (ML); dark gray; 60% fines, nor sand, fine; organic debris, wood, roots; wet.	n plastic; 40
41 42	41.0 to 47.0 feet: SILTY SAND (SM); dark gray; 25% fines, no sand, fine to medium; organic debris, roots, woody debris; v petroleum-like odor.	

Maul F	oster & A	Along	i, Ir	nc.		t Numbe	er	Borehole Log/Well Con Well Number	Sheet
	Well				8128 ample Data	3.01.06	; 	WS-11 Soil Description	3 of 11
Depth (feet, BGS)	Details	Interval	Recovery	Collection Method	amipie Dalia Jagum Name (Type,	Blows/6"	Lithologic Column	Sui Descripio	JII
43									
44									
"									
45					PID = 0.0	,			
46									
47									
		_ 10	00%	СВ	PID = 0.0	,		47.0 to 50.0 feet: SILTY SAND (SM); a sand, fine to medium; micaceous; o	
48									
49									
50									
_, 🐰					PID = 0.0	)		50.0 to 53.5 feet: SAND with SILT (SP- plastic; 85% sand, fine to medium; r	
51									
52					PID = 0.0	,			
53									
54					PID = 0.0	,		53.5 to 54.0 feet: SILT (ML); dark gray;	95% fines. low to medium plasticity
<sup>34</sup>								<u> </u>	<u>caceous; organic debris.</u> SM); dark gray; 15% fines, non
55								plastic; 85% sand, fine to medium; r	micaceous; wet.
56									
57									
58		10	00%	СВ	PID = 0.0			57.0 to 58.0 feet: SILTY SAND (SM); a sand, fine to medium; micaceous; o	
_ 🐰					PID = 0.0	,		58.0 to 59.0 feet: SILT (ML); dark gray; fine sand in pockets; micaceous; o	
59					5 = 0.0			59.0 to 60.0 feet: SAND with SILT (SP-	
€ 👹					PID = 0.0	,		plastic; 85% sand, fine to medium; r	
61								sand, fine to medium, micaceous; o	
<i>€</i> 2 ₩									
<u> </u>		10	00%	СВ	PID = 0.0	,			
€3					PID = 0.0	,			
64									
<i>6</i> 5								64.0 to 67.0 feet: SAND (SP); dark gray fine to medium; micaceous, coarse	
- KXXI	1. CB=4x6-inch (	core barrel	soil sa	mpler. 2	. PID = Photo ionization	detector: s	soil head snace r	eading in parts per million. 3. GW=groundwater sa	mple, dashed graphic indicates approximate
		4. bgs=b	elow g	ground s	urface. 5. PVC=poly			Ç	

Maul Foster & Al	onai. Ir	nc.	Project N			Borehole Log/Well Co	Sheet
	-··y·, "		8128.0			WS-11	4 of 11
Details  Well Details	Interval Percent Recovery	Collection Method	ample Data  Jagury  Name (Type)	Blows/6"	Lithologic Column	Soil Description	
66			PID = 0.0				
67							
	100%	СВ	PID = 0.0		यास्यास्य	67.0 to 67.5 feet: NO RECOVERY; s 67.5 to 72.0 feet: SAND (SP); dark g	
68			PID = 0.0			fine; micaceous; organic debris, i	roots; moist to wet.
70							
71		GW	WS11-W-72.0 PID = 0.0	)		@ 70.0 feet: 0.2-foot layer of silt with	n organic debris.
72	80%	СВ	PID = 0.0			72.0 to 75.0 feet: NO RECOVERY; s	iluff.
73							
<sup>74</sup>							
76						75.0 to 78.0 feet: SILTY SAND (SM) sand, fine to medium; micaceous,	
77							
<sup>78</sup>			PID = 0.0			78.0 to 82.0 feet: SAND (SP); dark g fine; micaceous; wet.	ray; 5% fines, non plastic; 95% sand,
<i>ε</i>			PID = 0.0				
81			7 15 = 0.0				
2			PID = 0.0			82.0 to 83.0 feet: SILT (ML); dark gra fine, sand in pockets; micaceous	
84						83.0 to 84.0 feet: SAND (SP); dark g fine; micaceous; organic debris; v	ray; 5% fines, non plastic; 95% sand,
85 <b>8</b>						84.0 to 85.5 feet: SILTY SAND (SM) sand, fine to medium; micaceous,	
86	= = = = = =	GW	WS11-W-87. PID = 0.0	þ		85.5 to 86.0 feet: SILT (ML); dark gra fine, sand in pockets; micaceous	; moist.
87						86.0 to 87.0 feet: SAND (SP); dark g fine; 5% organic debris, woody d	ray; 5% fines, non plastic; 90% sand,
	<del>-</del> 100%	СВ	PID = 0.0			87.0 to 87.5 feet: SAND (SP); dark g	ray; 5% fines, non plastic; 95% sand,

Maı	ul Foster & A	Alonai. I	nc.	Project N		c Borehole Log/Well Con	Sheet
		·		8128.0		WS-11 5 of 1	
Depth (feet, BGS)	Well Details	Interval Percent Recovery	Collection Method	ample Data ja Ling Name (Type)	Blows/6" Lithologic Column	Soil Descriptid	n
88 89				PID = 0.0		fine; micaceous; wet.   87.5 to 88.0 feet: SILT with SAND (ML  30% sand, fine to medium; micaceo   88.0 to 92.5 feet: SAND (SP); dark gray   fine; micaceous; wet.	ous; organic debris; moist to wet.
90 91				PID = 0.0			
92							
93						92.5 to 94.5 feet: SILT (ML); dark gray; sand, fine to medium, sand in pock	90% fines, medium plasticity, 10% ets; micaceous; organic debris; wet.
94 95				PID = 1.5		94.5 to 98.0 feet: SAND (SP); dark gra fine; micaceous; wet.	y; 5% fines, non plastic; 95% sand,
96				110 - 1.0			
97 98				PID = 1.5			
99						98.0 to 102.0 feet: SAND with SILT (SF plastic; 85% sand, fine to medium; nodules, up to 0.5-inches in diamete	micaceous; wet. Fines occur in
100			GW	WS11-W-102. PID = 4.5	0		
102 103	88 80 00 00 00 00 00 00 00 00 00 00 00 0	100%	СВ	PID = 13.6		102.0 to 107.0 feet: SAND (SP); dark g fine to medium, red and green lithic	ıray; 5% fines, non plastic; 95% sar s; micaceous; wet.
104	20 00 00 00 00 00 00 00 00 00 00 00 00 0			PID = 0.0			
105 106				PID = 0.0		@ 105.0 feet: 0.2-foot layer of SILT (Mi fine, sand in pockets; wet. @ 105.5 feet: 0.2-foot layer of SILT (Mi	
107		- 90%	СВ	PID = 0.0		fine, sand in pockets; wet.  107.0 to 108.0 feet: NO RECOVERY.	
108				PID = 3.0		108.0 to 112.0 feet: SILT (ML); dark gr to medium plasticity; micaceous; or	ay to greenish-gray; 100% fines, lo ganic debris, roots, leaves; wet.
109 110						Visible sheen on water in soil core bag.	
NOTE				PID = Photo ionization de urface. 5. PVC = poly viny		reading in parts per million. 3. GW=groundwater sa	mple, dashed graphic indicates approximate
	Approximate w	· ·			<del></del> -		

### 100% CB PID = 0.0  ### 122.0 to 1230 feet SLT (ML), SM, dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 100% CB PID = 0.0  ### 122.0 to 1230 feet SLT (ML), SM, dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 100% CB PID = 0.0  ### 122.0 to 1230 feet SLT (ML), SM, dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.  ### 122.0 to 1230 feet SLT (ML), dark gay, 20% lines, non plastic, 35% san line to machum, red and green lifes, micaceous, wet.	### Surptice Date   Surptice D	Mai	ıl Fostar & A	Monai Ir	10	Dminst N			Borehole Log/Well Con	struction  Sheet
PID = 3.1	PID = 0.1		ui rostei & A	viorigi, ii		8128.0				
113  114  115  116  117  117  118  119  119  1100% CB PID = 3.1  PID = 6.2  1180 to 1180 feet. SAND (SP), dark gray, 5% fires, non plastic, 95% san fire to medium, red and green litrics; microcous; wet.  119  1100% CB PID = 3.1  PID = 6.2  1180 to 1185 feet. SLTY SAND (SIM, dark gray, 20% fires, non plastic, 96% san fire to medium, red and green litrics, microcous; wet.  119  120  121  122  123  124  PID = 0.0  PID	12.0 to 118.0 feet: SAND (SP); dark gay; 5% fines, non pleate; 95% sen fine to medium, red and green lifting; microbious; well.	Depth (feet, BGS)		Interval Percent Recovery	Collection Method		Blows/6"	Lithologic Column	Soil Description	
1160	Withward PiD = 3.1  PID = 6.2  PID = 3.1  PID = 6.2  FIRD to TIRS feet: SLTY SAND (SM), dark gray, 20% fires, non plastic, 36% sand fine to machin, well.  Service odar velosity sheer on said.  PID = 0.0  PID =	112 113								
PID = 6.2	PID = 6.2	116		100%		WS11-W-DUF PID = 3.1			@ 116.0 feet 0.1-foot layer of SILT (ML	.).
120	PID = 0.0					PID = 6.2			80% sand, fine to medium; wet. Strong odor, visible sheen on soil. 118.5 to 119.5 feet: SILT (ML); dark gra	y; 95% fines, low to medium
123   PID = 0.0   122.0 to 123.0 feet: SILT (NIL); dark gray; 95% fines, low to medium plasticity; 5% sand, fine to medium; micaceous; wet.   124   PID = 0.0   123.0 to 127.0 feet: SAND (SP); dark gray; 5% fines, non plastic; 95% san fine to medium, red and green lithics; micaceous; wet.   125   PID = 0.0   127.0 to 128.0 feet: SILTY SAND (SM); dark gray; 20% fines, non plastic; 80% sand, fine to medium, red and green lithics; wet.   128	PID = 0.0	121				PID = 0.0		177.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7	119.5 to 119.7 feet: SAND (SP); dark gr  fine_to_ <u>medium, red and green lithics</u>   119.7 to 120.0 feet: SILT (ML); dark gra   <u>plasticity: 5% sand, fine to medium;</u>   120.0 to 122.0 feet: SAND (SP); dark gr	ay; 5% fines, non plastic; 95% sar ; <u>micaceous; wet</u> y; 95% fines, low to medium <u>micaceous: wet</u> ay; 5% fines, non plastic; 95% sar
PID = 0.0   PID	PID = 0.0	123				PID = 0.0			plasticity; 5% sand, fine to medium; 123.0 to 127.0 feet: SAND (SP); dark gi	micaceous; wet. ay; 5% fines, non plastic; 95% sar
PID = 0.0  PID = 0.0  PID = 0.0  127.0 to 128.0 feet: SILTY SAND (SM); dark gray; 20% fines, non plastic; 80% sand, fine to medium, red and green lithics; wet.  128.0 to 132.0 feet: SAND (SP); dark gray; 5% fines, non plastic; 95% sar fine to medium, red and green lithics; micaceous; wet.  GW  WS11-W-132.0  PID = 0.0  PID = 0.0  131.0	128  129  130  130  131  132  132  138  149  150  160  170  170  170  170  170  170  17		######################################			PID = 0.0				
fine to medium, red and green lithics; micaceous; wet.  GW WS11-W-132.0	fine to medium, red and green lithics; micaceous; wet.    130			100%	СВ	PID = 0.0			80% sand, fine to medium, red and	green lithics; wet.
131   GW   WS11-W-132.0	GW WS11-W-132 0 [] @ 130.0 feet: 0.3-foot layer of SILT (ML); dark gray; organic debris.  131  132  132  133.0 to 137.0 feet: SAND (SP); dark gray with white speckles, salt and SAND (SP); dark gray with white s	129								
**************************************	NOTES: 1. CB=4x6-inch core barrel soil sampler. 2. PID=Photo ionization detector, soil head space reading in parts per million. 3. GW=groundwater sample, dashed graphic indicates approximate				GW		0		@ 130.0 feet: 0.3-foot layer of SILT (ML	.); dark gray; organic debris.
		132		100%	СВ	PID = 0.0			132.0 to 137.0 feet: SAND (SP); clark g	ray with white speckles, salt and

Mau	ul Foster & A	Alongi,	lnc.	Project N <b>8128.</b> 0			Well Number <b>WS-11</b>	Sheet 7 of 11
(S;	Well		<sub>2</sub> S	ample Data			Soil Description	
Mell (feet, BGS)  Interval   Percent   Recovery   Collection   Method   Collection   Collection			Collection Method <sub>C</sub>	Name (Type)	Blows/6"	Lithologic Column		
133 134				PID = 0.0			pepper look; 5% fines, non pl wet.	astic; 95% sand, medium; micaceous,
135				PID = 0.0				
136 137								
138		70%	СВ	PID = 0.0		2000	137.0 to 140.0 feet NO RECOVERY.	
139								
140	10000 00 00 00 00 00 00 00 00 00 00 00 0			PID = 0.0			140.0 to 146.5 feet: SAND (SP); dark	k gray with white speckles, salt and 95% sand, medium, dark green and
141							red lithics; micaceous; wet.	. So, o Saina, modern, dain growt and
142 143								
144				PID = 0.0				
145		= = = = =	GW	WS11-W-147. PID = 0.0	o			
146				PID = 0.0			146.5 to 147.0 feet: SILT (ML); dark g	nrav 95% fines low to medium
147 148		100%	6 СВ	PID = 0.0			146.5 to 147.0 feet: SILT (ML); dark ( 1 <u>plasticity: 5% sand, fine to mediur</u> 147.0 to 150.0 feet: SAND (SP); dark medium, dark green and red lithic	<u>m, sand in pockets; micaceous; wet.</u> ; gray; 5% fines, non plastic; 95% sar
149				PID = 0.0				
150				PID = 0.0			150.0 to 152.0 feet: SILT with SAND	(ML); dark gray; 70% fines, low to
151							medium plasticity; 30% sand, fine organic debris; wet.	to medium, sand in pockets; micaced
152							152.0 to 153.0 feet: SAND (SP); dark medium, dark green and red lithic	
153 154				PID = 0.0			organic_debris; wet	to medium, sand in pockets; micaced
155							153.5 to 157 feet: SAND with SILT (S	n, red and green lithics; organic debri
NOTE				2. PID=Photo ionization de curface. 5. PVC=poly vinj			reading in parts per million. 3. GW=groundwater	sample, dashed graphic indicates approximate

	JE- 4 0 3								c Borehole Log/Well Construction		
Maı	ul Foster & A	vioné	gı, Ir 	nc.		Project N <b>8128.</b> 0			Well Number WS-11	Sheet 8 of 11	
Depth (feet, BGS)	Well Details	Interval	Percent Recovery	Collection Method	ample L	Data Name (Type)	Blows/6"	Lithologic Column	Soil Descriptio	on	
. 156						PID = 0.0					
_ 156 _ 157		- 1	00%	СВ		PID = 0.0			√ <u>@ 157.0 feet: 0.2-foot layer of SILT (MI</u> 157.2 to 160.0 feet: SAND (SP); dark g	_) rray with white speckles, salt and	
_ 158 . 159									pepper look; 5% fines, non plastic; 9 lithics; wet.	5% sand, medium, green and red	
_ 160						PID = 0.0				III ) chalk comus 700/ finos low to	
_ 161	<u> </u>					FID = 0.0			medium plasticity; 30% sand, fine to  161.0 to 164.0 feet: SAND (SP); dark g pepper look; 5% fines, non plastic; 9	medium; wet. Iray with white speckles, salt and	
_ 162 . 163	0]0]0]0]0  0000000  0000000  0000000  00000000								(@162.0 feet: 0.3-foot layer of SILT (ML		
_ 164	00000000000000000000000000000000000000					PID = 0.0			@162.8 feet 0.3-foot layer of SILT (ML		
_ 165	00000000 0000000 00000000 00000000 00000	≣		GW	и	VS11-W-167.	o		164.0 to 165.0 feet: SILT (ML); dark gramedium plasticity; 10% sand, fine, s 165.0 to 165.5 feet: SANDY SILT (ML);	sand in pockets; organic debris; we	
_ 166 . 167						PID = 0.0			Tines, non plastic: 40% sand, fine: v 165.5 to 167.0 feet: SAND (SP); dark g pepper look; 5% fines, non plastic; 9 lithics; wet.	ray with white speckles, salt and	
_ 167 _ 168	0,00,00,00,00,00,00,00,00,00,00,00,00,0	<u>=</u> 8	80%	СВ		PID = 0.0		2-2-2-2-2	167.0 to 169.0 feet. NO RECOVERY.		
_ 169	000000000 00000000 00000000 0000000 0000										
_ 170	67676767676 10101010101 0101010101 0101010101					PID = 0.0			pepper look; 5% fines, non plastic; wet.  170.5 to 171 feet: SILTY SAND (SM); o	, , ,	
_ 171 _ 172 _	00000000000000000000000000000000000000								\ <u>80% sand, fine; wet.</u> 171.0 to 174.0 feet: SAND (SP); dark g fine to medium, dark green and red	ray; 5% fines, non plastic; 95% san	
173 174						PID = 0.0					
- <sup>174</sup> _ 175	\$\f\delta\f\de					PID = 0.0			174.0 to 174.5 feet: SILT (ML); dark gra medium plasticity: 10% sand, fine. s 174.5 to 179.0 feet: SAND (SP); dark g pepper look; 5% fines, non plastic; 9	sand in pockets; wet ray with white speckles, salt and	
_176									red lithics; wet.		
_ 177		- 1	00%	СВ		PID = 0.0					
NOTE	ES: 1. CB=4x6-inch of screened interval.								eading in parts per million. 3. GW=groundwater sa	mple, dashed graphic indicates approximate	
$\nabla$	Approximate wa			serve	d						

Иa	ul Foster & /	Alonai.	Borehole Log/Well Co	Sheet				
	Jotol W/				.01.06		WS-11	9 of 11
(feet, BGS)	Well Details	Interval Percent Recovery	Collection Method	Sample Data   jag     Same (Type)   X	Blows/6"	Lithologic Column	Soil Descri <sub>l</sub>	otion
78 70	0  0  0  0  0  0  0  0  0  0  0  0  0			PID = 0.0				
79 80							179.0 to 182.0 feet: SAND (SP); dar pepper look; 100% sand, mediun	
81			GW	WS11-W-18. PID = 0.0				
32	00000000000000000000000000000000000000	100%	6 СВ	PID = 0.0				k gray; 5% fines, non plastic; 95% s
33 34				PID = 0.0				
35				PID = 0.0				
36 37	676767676 00000000 00000000 00000000 00000000							
,, 38	ōjōjōjōjō J0J0J0J0J0 0J0J0J0J0 J0J0J0J0J0	90%	СВ	PID = 0.0		2032/2013	187.0 to 188.0 feet. NO RECOVERY.	
39 30							188.0 to 195.0 feet: SAND (SP); dan fine, red lithics; wet.	k gray; 5% fines, non plastic; 95% s
01	\$\int\text{0}\			PID = 0.0				
12 13	676767676 1010101010 1010101010 1010101010 10101010			DID CO				
14	00000000000000000000000000000000000000			PID = 0.0				
15 16	00000000 00000000 00000000 00000000 0000		GW	WS11-W-19 PID = 0.0			wet.	pockets; organic debris, roots, lea
7	00000000 00000000 00000000 00000000 0000	40%	СВ	PID = 0.0			195.5 to 201.0 feet: SAND (SP); dan fine to medium, red lithics; wet.	k gray; 5% fines, non plastic; 95% s
8	010101010 010101010 010101010 010101010			1.2 = 3.0				
19	00000000000000000000000000000000000000							
ОТ	ES: 1. CB=4x6-inch	core barrel soil s	sampler. 2	2. PID = Photo ionization	detector,	soil head space i	reading in parts per million. 3. GW=groundwate	r sample, dashed graphic indicates approxima
	screened interval.  Approximate wa			surface. 5. PVC=poly v	nyi chlor	nae.		

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					Geologic Borehole Log/Well Construction							
Maı	ul Foster & A	Jongi, l	nc.		Project l	Vumbe	r	Well Number	Sheet			
					8128.	01.06		WS-11	10 of 11			
(S:	Well		<sub>2</sub> S	ample D	Data			Soil Description	on			
Depth (feet, BGS)	Details	Interval Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column					
202		рининининин	GW		PID = 0.0  PID = 0.0			201.0 to 204.5 feet: SILTY GRAVEL (G 85% gravel, fine to coarse, subroun 204.5 to 207.0 feet: BASALT; light gray (Columbia River Basalt Group) Sign hardness.	to dark gray; moist to wet; bedrock.  nificant increase in resistance, drilling			

Total Depth = 207.0 feet below ground surface.

#### WS11 Completion Details

Oregon Water Resources Department Well Start Card Number: W147655 Oregon Water Resources Department Well Identification Number: L67076

#### Boring:

0.0 to 58.0 feet bgs: 9-inch temporary, threaded steel, isolation casing. 0.0 to 137.0 feet bgs: 8-inch temporary, threaded steel, isolation casing. 0.0 to 58.0 feet bgs: 7-inch temporary, threaded steel, isolation casing. 0.0 to 207.0 feet bgs: 6-inch temporary, threaded steel, isolation casing. 0.0 to 207.0 feet bgs: 4x6-inch core barrel sampler.

0.0 to 1.5 feet bgs: flush mount vault and cement seal.

1.5 to 5.0 feet bgs: 3/8-inch Baroid bentonite chips hydrated with potable water.

5.0 to 102.0 feet bgs: bentonite grout slurry, 10.0 pounds per gallon. 102.0 to 104.0 feet bgs: non-acetone coated, 3/8-inch bentonite chips hydrated with potable water.

104.0 to 106.0 feet bgs: 20x40 washed Colorado silica sand, secondary filter pack.

106.0 to 124.0 feet bgs: 10x20 washed Colorado silica sand, primary filter pack.

124.0 to 126.0 feet bgs: non-acetone coated, 3/8-inch bentonite chips hydrated with potable water.

126.0 to 139.0 feet bgs: bentonite grout slurry, 10.3 pounds per gallon. 139.0 to 140.0 feet bgs: non-acetone coated, 3/8-inch bentonite chips

hydrated with potable water. 140.0 to 142.0 feet bgs: 20x40 washed Colorado silica sand, secondary filter

pack.

142.0 to 161.0 feet bgs: 10x20 washed Colorado silica sand, primary filter pack.

161.0 to 207.0 feet bgs: non-acetone coated, 3/8-inch bentonite chips hydrated with potable water.

#### Well WS11-125:

0.0 to 109.0 feet bgs: 2-inch diameter, schedule 40 PVC blank riser pipe. 109.0 to 124.0 feet bgs: 2-inch diameter, stainless steel wire wrapped screen, 0.010-slot.

124.0 to 125.0 feet bgs: 2-inch diameter, stainless steel sump.

			Geologic Borehole Log/Well Construction								
Mau	ıl Foster & A	longi, Inc.	Project Number			Well Number	Sheet				
			8128.01.06			WS-11	11 of 11				
oth et, BGS)	Well Details	val ent overy	Sample Data   ja     & Name (Type)	"9/sm	ologic umn	Soil Descriptio	n				
Depth (feet,		Inter Perc Recc Colle	Name (type)	Blo	Lith						

Well WS11-161:
0.0 to 145.0 feet bgs: 2-inch diameter, schedule 40 PVC blank riser pipe.
145.0 to 160.0 feet bgs: 2-inch diameter, stainless steel wire wrapped screen, 0.010-slot.
160.0 to 161.0 feet bgs: 2-inch diameter, stainless steel sump.

Project   Dasie   Project   Dasie	Maul Foster 8	k Alongi, l	Inc.	Project <i>l</i> <b>8128.</b>	Number -	ic Borehole Log/Well C  Well Number WS-14	Sheet 1 of 11
Metals   Details   Detai	Project Location Start/End Date Driller/Equipment Geologist/Engineer	7200 NW Fi 6/22/2004 to Boart Long ABC/EB	ront Ave o 7/9/20 year/Ro	on enue Portland, Ore 04 tosonic		TOC Elevation Surface Elevat Northing Easting Hole Depth	(feet) 32.4 705183.4 7624486.1 210.0-feet
100 CB  PID = Opport.  PID = Opport.  PID = Opport.  OB 9.5-feet: Increased fines to 50%.  PID = Opport.  PID =	i						
non plastic; 30% gravels, fine, subangular, trace organic debris; dry.  1.3 to 10.0 feet: SIRTY SAND (SIM), dark gray; 40-50% fines, low plasticity, 50-60% sand, fine, damp.  1.3 to 10.0 feet: Increased fines to 50%.  1.3 to 10.0 feet: slight odor.  1.3 to 10.0 feet: slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; trace organic debris; slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; trace organic debris; slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; trace organic debris; slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; trace organic debris; slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; trace organic debris; slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; trace organic debris; slight odor.  1.4 to 16.0 feet: SAND (SIP), light gray/sh-brown; 100% sand, fine; trace fines; 30% gravels, fine to medium, subangular; trace fines; damp.  1.5 to 22.0 feet: SAND (SIP), dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.	Details (Leet, BG	Interval Percent Recover	Collectic Method	Name (Type)	Blows/6' Lithologi Column		
110 CB  1100 CB  1100 TA.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace gravels, fine to coarse; trace organic debris; slight odor; tarr-like balls; damp.  14  14  15  16  17  18  19  19  100 CB  PID = Oppm.  11.0 to 14.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.  16.0 to 18.5 feet: GRAVELLY SAND (SP): light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular, trace fines; damp.  18  19  100 CB  PID = Oppm.  11.0 to 14.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.  18  19  10  11.0 to 14.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.		100	СВ			0.0 to 1.3 feet: GRAVELLY SILT (Non plastic; 30% gravels, fine,	AL); dark yellowish-brown; 70% fines, subangular; trace organic debris; dry.
110 CB  1100 CB  1100 TA.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace gravels, fine to coarse; trace organic debris; slight odor; tarr-like balls; damp.  14  14  15  16  17  18  19  19  100 CB  PID = Oppm.  11.0 to 14.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.  16.0 to 18.5 feet: GRAVELLY SAND (SP): light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular, trace fines; damp.  18  19  100 CB  PID = Oppm.  11.0 to 14.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.  18  19  10  11.0 to 14.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			PID=0ppm.	<b>9</b> D	1.3 to 10.0 feet: SILTY SAND (SM) 50-60% sand, fine; damp.	; dark gray; 40-50% fines, low plasticity;
11   10   CB   PID=Oppm.   11.0 to 14.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace gravels, fine to coarse; trace organic debris; slight odor; tarr-like balls; damp.   14.0 to 16.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.   14.0 to 16.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.   16.0 to 18.5 feet: GRAVELLY SAND (SP); light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular, trace fines; damp.   18.5 to 22.0 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.		80%	СВ				
110 CB  PID = Oppm.  120 CB  PID = Oppm.  130 CB  PID = Oppm.  140 In 16.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; slight odor; tarr-like balls; damp.  140 In 16.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.  150 In 160 In 16.5 feet: GRAVELLY SAND (SP): light grayish-brown; 70% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.  180 In				PID = 0ppm.		@ 5.0-feet: Increased fines to 50%	
110 CB  PID = Oppm.  120 CB  PID = Oppm.  130 CB  PID = Oppm.  140 In 16.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; slight odor; tarr-like balls; damp.  140 In 16.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.  150 In 160 In 16.5 feet: GRAVELLY SAND (SP): light grayish-brown; 70% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.  180 In	7	95%	СВ				
110 CB  PID = Oppm.  120 CB  PID = Oppm.  130 CB  PID = Oppm.  140 In 16.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; slight odor; tarr-like balls; damp.  140 In 16.0 feet: SAND (SP): light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor, damp.  150 In 160 In 16.5 feet: GRAVELLY SAND (SP): light grayish-brown; 70% sand, fine; trace fine; 30% gravels, fine to medium, subangular, trace fines; damp.  180 In	- 8			PID=0ppm.			
12   100   CB   11.0 to 14.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace gravels, fine to coarse; trace organic debris; slight odor; tarr-like balls; damp.  14   14   14   14   15   16.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor; damp.  15   16   17   18   19   16.0 to 18.5 feet: GRAVELLY SAND (SP); light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular; trace fines; damp.  18   19   18.5 to 22.0 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.	XXI XXI XXI					10.0 to 11.0 feet: SAND (SP); light	grayish-brown, 100% sand, fine; trace p.
PID = 0ppm.  14.0 to 16.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor; damp.  16  PID = 0ppm.    16.0 to 18.5 feet: GRAVELLY SAND (SP); light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular; trace fines; damp.    18   19   PID = 0ppm.    18.5 to 22.0 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.		<sup>-</sup> 100	СВ			fines; trace gravels, fine to coa	grayish-brown; 100% sand, fine; trace rse; trace organic debris; slight odor;
15  16  PID = Oppm.  PID = Oppm.  18  19  PID = Oppm.  18.5 to 22.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines, non plastic; damp.  18.5 to 22.0 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.				PID=0ppm.			
PID = Oppm.  PID = Oppm.  16.0 to 18.5 feet: GRAVELLY SAND (SP); light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular; trace fines; damp.  18  19  PID = Oppm.  PID = Oppm.  PID = Oppm.  PID = Oppm.  18.5 to 22.0 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.						14.0 to 16.0 feet: SAND (SP); light fines; trace organic debris; no	grayish-brown; 100% sand, fine; trace noticeable odor; damp.
- 18 - 19 - 19 - 19 - 19 - 19 - 19 - 19 - 19		- <sub>100</sub>	СВ	PID = 0ppm.		16.0 to 18.5 feet: GRAVELLY SAN fine; 30% gravels, fine to medi	D (SP); light grayish-brown; 70% sand, um, subangular; trace fines; damp.
PID=0ppm. trace fines, non plastic; damp.	_ 18						
	20			PID = 0ppm.		18.5 to 22.0 feet: SAND (SP); dark trace fines, non plastic; damp.	yellowish-brown; 100% sand, fine;

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly viryl chloride. 6. Odor characteristic of manufactured gas plant waste.

Vlaul	Foster &	Alongi, l	Inc.	Project Number 8128.01.08			Borehole Log/Well Cor Well Number WS-14	Sheet 2 of 11
Depth (feet, BGS)	Well Details	Interval Percent Recovery Collection Method Co		mple Data  Particle (Type)  Name (Type)	Blows/6" Lithologic Column		Soil Description	
21		- 100	СВ	PID = 0ppm.			22.0 to 22.5 feet: SILT (ML); light brow	nish-gray; 85% fines, low plastic
23		- <sub>100</sub>	СВ				15% sand, fine; trace gravels, fine organic debris; trace woody debris; trace woody debris; trace fines, non plastic; damp.  23.5 to 26.0 feet: GRAVELLY SILT (Manadium plasticity; 35% gravels, fine organic debris fines).	s; damp. lowish-brown; 100% sand, fine; L); light grayish-brown; 65% fine
25 26				PID = 0ppm.			sand; moist.	
27 28		100	СВ	PID = 29.7ppm			26.0 to 29.0 feet: GRAVELLY SILT (M medium plasticity; 35% gravels, fir sand; strong sheen and odor; pos	ne to coarse, subangular; trace
29 30 31							29.0 to 33.0 feet: SANDY SILT (ML); of plasticity; 35% sand, fine; heavy so possible product; moist.	
32 33		<sup>-</sup> 100	СВ	PID = 8.1ppm. PID = 0ppm.			33.0 to 35.0 feet: SILTY SAND (SM); c	tark gravish-brown: 40% fines. I
3 <i>4</i> 835				PID = 0ppm.			plasticity; 60% sand, fine; subrour diameter; heavy sheen and odor; 35.0 to 35.5 feet: SAND (SP); light yell	nded clast approximately 5-inch moist.
36 37		= 90	СВ	ть — орын.			ines, non plastic; heavy sheen an 35.5 to 38.5 feet: SAND (SP); dark brofines, non plastic; heavy sheen an	<u>d odor; moist</u>
38 39 40				PID = 0ppm.			38.5 to 52.5 feet: SILTY SAND (SM); o to low plasticity; 75% sand, fine; tra odor; wet.	dark brownish-gray; 25% fines, r ace gravels, subangular; strong
41 42		<sup>-</sup> 100	СВ	PID = 8ppm.				
NOTES:							l head space reading in parts per million. 3. ( C= poly vinyl chloride. 6. Odor characteristic	

Maril Fastar & Alamai Ina											Borehole Log/Well Construction		
Maul Foster & Alongi, Inc.							Project Number			er	Well Number	Sheet	
							8128.01.08				WS-14	3 of 11	
Depth (feet, BGS)			/ell tails	Interval	Percent Recovery	Collection Method S	ample Numper	Data     Name (Type)	Blows/6"	Lithologic Column	Soil Description	on	
		NV1	NXI									- <u>-</u>	
43								PID=0ppm.					
47								PID = 0ppm.					
50								PID = 0ppm.					
53 54 55								PID = 0ppm.			52.5 to 53.0 feet: SILT (ML); dark brow 10% sand, fine; strong odor; moist 53.0 to 55.5 feet: SILTY SAND (SM); o to low plasticity; 75% sand, fine; tra odor; wet.	to wet	
56				ŀ	100	СВ		PID=0ppm.			55.5 to 56.0 feet: SILT (ML); dark brow 10% sand, fine; strong odor; moist 56.0 to 58.0 feet: SAND WITH SILT (S fines, non plastic; 85% sand, fine; s	to wet. P-SM); dark brownish-gray; 15%	
59 60								PID = 0ppm.			58.0 to 66.0 feet: SILTY SAND (SM); on non to low plasticity; 75 to 80% sat strong odor; wet.  @ 60.0 feet: 3-inch silt layer.	dark brownish-gray; 15 to 20% fines, nd, fine; trace cobbles, subrounded;	
62 63 64					90	СВ		PID = 0ppm.			@ 63.5.0 feet: odor becoming slight.		
65												=	

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.

	Maul Foster & Alongi, Inc.										Borehole Lo		
	Mau	I Fost	er & A	\lor	ngi, I	inc.		Project N <b>8128.</b> 0		er		lumber 5-14	Sheet <b>4 of 11</b>
-		<u> </u>	A/o#	Т					71.06	T	VVS		
	Depth (feet, BGS)		Vell etails	Interval	Percent Recovery	Collection Method S	ample Numper amp	Data     Name (Type)	Blows/6"	Lithologic Column		Soil Descriptio	n
E		× ×	×					PID = 0ppm.		<u> </u>	,		
E	66							"					<u> </u>
	_ 67			ľ	100	СВ					to low plasticity wet.	; 20% sand, fine; mi	ark grayish-brown; 80% fines, non caceous; moderate odor; moist to
	68										67.0 to 69.5 feet: S 95% sand, fine	AND (SP); dark gray e; micaceous; no noti	vish-brown; 5% fines, non plastic; iceable odor; moist to wet.
	- 69							PID = 0ppm.			@ 68.0 feet: 2-inch	n silt layer.	
	70										69.5 to 70.0 feet: S	:ILT (ML); dark gray;	85% fines, low plasticity; 15%
	-										<u>sand, fine; moi</u> 70.0 to 71.0 feet: S	st.	rish-brown; 5% fines, non plastic;
	_ 71				0	СВ		PID = 0ppm. WS14-W-71			71.0 to 75.5 feet: N		
	_ 72												
	_ 73												
E	<sub>-</sub> 74												<u> </u>
	<sub>-</sub> 75												
	<sub>-</sub> 76				100	СВ	,	PID = 9.4ppm	•		75.5 to 81.5 feet: S plastic; 95 to 10	AND (SP); dark brow 00% sand, fine; mica	wnish-gray; trace to 5% fines, non ceous; slight odor; wet.
	_ 77												
	_ <i>7</i> 8			L	100	СВ		PID = 0ppm.					-
	_ <i>7</i> 9							гід = орріп.			@ 79.0 feet: trace	silty halls	
	_ 80										70.01001. #400	only band.	-
	81							DID O					
70	_ 82							PID = 0ppm.			81.5 to 82.5 feet: S sand, fine; sligh	iLT (ML); dark gray; nt odor; wet.	90% fines, medium plasticity; 10%
PJ 4/13/	_ 83										82.5 to 83.5 feet: S moderate odor		r; 100% sand, fine; trace fines;
S14-17.G	_ 84							PID = 0ppm.			sand, fine; sligh	nt odor; wet.	90% fines, medium plasticity; 10%
28-01\W	_ 85										moderate odor	; wet.	r; 100% sand, fine; trace fines;  //L); dark gray; alternating 1/4-inch
GBLWC W:\GINT\GINTWAROJECTS\8128-01\WS14-17.GPJ 4/13/07	_ 86							WS14-W-86			to 1/2-inch san	d and silt layers; wet AND (SP); dark gray	
SINTWAP	87							PID=0ppm.			•		
N:\GINT\6	NOTE												W = groundwater sample, dashed graphic f manufactured gas plant waste.
3BLWC V													

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.

Maul Foster & Alongi, Inc.						Project N <b>8128.0</b>		er	Well Number <b>WS-14</b>	Sheet <b>5 of 11</b>
(feet, BGS)	Well Details	Interval	Percent Recovery	Collection Method	ample Numper		Blows/6"	Lithologic Column	Soil Descripti	on
(fee		Inte	Per	Coll	Nun	Name (Type)	Blov	Lith		
38 39		I	100	СВ					87.5 to 88.0 feet: SANDY SILT (ML); g plasticity; 40% sand, fine; micace 88.0 to 89.5 feet: SILTY SAND (SM); g sand, fine; micaceous; slight odor;	ous; moderate odor; wet. gray; 15% fines, non plastic; 85%
90		ı				DID 40			89.5 to 90.5 feet: SILT (ML); dark gray trace sand, fine; micaceous; mois	
91		ı				PID = 13ppm.	•		90.5 to 92.0 feet: SILTY SAND (SM); g sand, fine; micaceous; sheen and	
92		ı								
93					,	PID = 28.3ppn	<b>7.</b>		92.0 to 96.0 feet: SILT (ML); gray; 100 trace sand, fine; micaceous; shee zones of 2-inch pockets with fine s	n and strong odor; moist. Sevel
94		ı								
95										
16 17		t	100	СВ		PID = 0ppm.			96.0 to 98.0 feet: SANDY SILT (ML); of plasticity; 15% sand, fine; micaced	
,, 18		ı								
99		ı				DID O			98.0 to 102.0 feet: SAND (SP); dark g fine; micaceous; strong odor; wet. 1/2-inch silt bands intermixed with	Between 99.0 and 99.5 feet se
00		ı				PID = 0ppm.				
01		ı				WS14-W-101	,		@ 100.5 feet: 1-inch silt layer.	
)2		L	100	СВ					102.0 to 105.0 feet: SAND (SP); gray;	100% sand fine micaceous tr
)3		ı	100	OB		PID = 0ppm.			fines; sheen and strong odor; wet.	10070 Sand, line, micaceous, uc
04		ı								
5		ı				PID = 84ppm.				0% fines, low plasticity; 10% sai
6		ı							fine; strong odor; moist. 105.5 to 106.0 feet: SAND (SP); gray; fines; sheen and strong odor; wet.	
)7									106.0 to 108.0 feet: SILT (ML); gray; 1 fine; trace rootlets; moderate odor @ 107.0 feet: 2-inch gray sand layer v	; moist.
8						PID = 9.5ppm			108.0 to 108.5 feet: SILTY SAND (SM , sand, fine; sheen and strong odor;	
9									108.5 to 110.5 feet: SILT (ML); gray; 1 fine; sheen and strong odor; mois:  @ 109.0 feet: 4-inch silty sand layer w	00% fines; low plasticity; trace s t.
10										

Maul Foster & Alongi, Inc.						Project N	Vumb		Borehole Log/Well C	Sheet <b>6 of 11</b>
ω Well , s Sar						8128.0 Data	8ט.דע	C)	Soil Description	
Depth (feet, BGS)	Details	Interval	Percent Recovery	Collection Method S	Number	Name (Type)	Blows/6"	Lithologic Column		
_111		-	100	СВ		PID = 0ppm.			110.5 to 111.0 feet: SAND (SP); gi fines; slight odor; wet. 111.0 to 113.0 feet: NO RECOVER	ray; 100% sand, fine; micaceous; trace
_113						PID = 0ppm.			non to low plasticity; 40% sand	(ML); dark brownish-gray; 60% fines, d, fine; micaceous; faint odor; moist to
_114 _115									wet. 114.0 to 120.5 feet: SAND (SP); d 95% sand, fine; micaceous; no	ark brownish-gray; 5% fines, non plasti o noticeable odor; wet.
_116 _117						PID = 0ppm.			@ 116.0 feet: 3-inch silt layer.	
_118										
119						PID = 0ppm.				
120 121						WS14-W-120	)		120.5 to 121.0 feet: SILT (ML); da	rk brownish-gray; 85% fines, low
122			100	СВ					plasticity; 15% sand, fine; mica 121.0 to 132.5 feet: SAND (SP); di micaceous; wet.	aceous; moist. ark gray; 100% sand, fine; trace fines;
124						PID = 0ppm.			@ 124 feet: sheen and strong odo	or present.
126										
127						PID = 0ppm.				
129										
130						PID = 0ppm.			@ 130 feet: sheen and strong odd	or fading.
129 130 131 132										

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.

	Mari Fratar O Alamai Inc									Borehole Log/Well Construction		
	Mau	ıl Foster & A	lo	ngi, I	Inc.	Project Number				Well Number	Sheet	
		1					8128.0	01.08		WS-14 7 of 11		
	Depth (feet, BGS)	Well Details	Interval	Percent Recovery	Collection Method S	ample   Number   Number	Data   Name (Type)	Blows/6"	Lithologic Column	Soil Descriptio	n	
			1	<u> </u>	ŭΣ	ž		B/	Üζ			
ŀ	100									132.5 to 133.5 feet: SILT (ML); dark gra	avish-brown: 90% fines. low	
ŀ	_133						PID = 0ppm.			plasticity; 10% sand, fine; micaceo		
ŀ	-	00000							<u>                                     </u>	133.5 to 134.0 feet: SAND (SP); dark g	rray: 100% sand fine: trace fines:	
	_134								Paragraph	micaceous; wet.	ay, 100% sand, line, trace lines,	
į									L	134.0 to 134.5 feet: SILT (ML); dark gra		
	135									plasticity; 10% sand, fine; micaceol		
										134.5 to 136.0 feet: SAND (SP); dark g micaceous; wet.	ray; 100% sand, line; trace lines;	
ı	136			0	CB					@ 135.5 feet: 3-inch silt layer.	<u> </u>	
		00000 00								136.0 to 138.5 feet: NO RECOVERY.		
	137	00000										
	120	60606										
ŀ	<u>-</u> 138	60606									<del>-</del>	
ŀ	-	00000 00		100	СВ				2555	138.5 to 141.5 feet: SAND (SP); dark g	rav: 5% fines, non plastic: 95%	
ŀ	<u>_</u> 139	00000 00					PID = 0ppm.			sand, fine; micaceous; slight odor;		
ı	<u> </u>										<u>.</u>	
ı	<u>-</u> 140	14.44 14 20.000 00									_ <u>-</u> -	
ŀ	=										= = = = = = = = = = = = = = = = = = = =	
	141										-	
	_142								ЩЩЩЦ	141.5 to 142.0 feet: SILT (ML); dark bro plasticity; 15% sand, fine; micaceo		
		医多结 同一		100	CB		PID = 0ppm.			@ 141.7 feet: 1-inch sand layer.	<b>.</b>	
	_143						WS14-W-142			142.0 to 143.0 feet: SAND (SP); gray; 1		
ı										143.0 to 145.0 feet: SILT (ML); gray; 10 plasticity; trace sand; moist.	)0% fines, medium to high	
	144									@ 143.5 feet: 3-inch sand layer.	3	
										ŕ		
ŀ	145	松连结 樹									3	
							PID = 0ppm.			145.0 to 148.5 feet: SILT (ML); gray; 10	00% fines, medium to high	
	146									plasticity; intermixed with 1-inch to	2-inch sand layers; moist.	
											-	
ı	<u> </u>											
ı	_147										=	
											=	
	148											
F	<u> </u>									 148.5 to 149.0 feet: SAND (SP); gray; 1	100% sand fine: trace fines: wet	
F	_149	[288]   [3]					PID = 0ppm.					
	<u> </u>						. 10 – oppin.		HTTTT!	plasticity; trace sand; moist.	Ī	
4/13/07	_150			100	СВ					149.5 to 150.0 feet: SAND (SP); gray; 1		
	-			100	05		WS14-W-150	'		150.0 to 167.0 feet: SAND (SP); gray; 5 fine to medium; trace wood debris;		
7.GP	_151										· ·	
14-1	<u> </u>										=	
\WS	_152						DID O			@ 452.0 facts 2 inch all leaves		
28-01	<u> </u>						PID = 0ppm.			@ 152.0 feet: 2-inch silt layer.		
3/812	_153										-	
SCT	<u> </u>										3	
307	154											
WP												
SINT	155											
GBLWC W:\GINT\GINTW\PROJECTS\8128-01\WS14-17.GPJ	NOTE	S: 1 CR = 4v6-incl	h cor	e harrel e	soil sam	nler 2	PID = Photo io	nizatio	n detector soil	head space reading in parts per million. 3. G	iW = groundwater sample, dashed graphic	
V:\G	.1012									C = poly vinyl chloride. 6. Odor characteristic o		
S S												
3BLV												
ا ت												

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly viryl chloride. 6. Odor characteristic of manufactured gas plant waste.

Maul Foster & Alongi, Inc.						Project N <b>8128.</b> 0	lumbe	er	Borehole Log/Well Cons Well Number WS-14	Sheet <b>8 of 11</b>	
Depth (feet, BGS)	Well Details	Interval	Percent Recovery	Collection Method S	ample		Blows/6"	Lithologic Column	Soil Description		
156						PID=0ppm.			@ 155.0 feet: Wood fragments.		
157									@ 157.0 feet: 3-inch silt layer.		
158						PID=0ppm.					
159											
160											
161 162						PID = 0ppm.					
163											
164						PID = 0ppm.					
65	10000000000000000000000000000000000000										
166	0110101010 1010101010 1010101010 1010101010 1010101010										
167		H	100	СВ		PID = 0ppm. WS14-W-167	ŧ		167.0 to 167.5 feet: NO RECOVERY; sl 167.5 to 169.5 feet: SAND (SP); gray; 1		
168 169	010101010 1010101010 010101010 10101010								fines; wet.		
170									169.5 to 172.0 feet: SAND (SP); gray; 1 increasing fines to 15%; wet.	00% sand, fine; micaceous;	
171						PID = 0ppm.			J		
172	000000000 00000000 00000000 00000000 0000								172.0 to 173.0 feet: SILTY SAND (SM);	gray; 35% fines, non plastic; 65%	
173	010101010 00000101 000000101 0000000101 000000					PID = 0ppm.			sand, fine; wet.  173.0 to 182.0 feet: SAND (SP); gray; 1 fines; wet.	00% sand, fine; micaceous; trac	
174	10101010101 0101010101 10101010101 10101010101										
176	1010101010 1010101010 1010101010 1010101010										
174 175 176 177 <b>NOTE</b>	\$\int\text{0} \int\text{0} \int		100	CP		PID = 0ppm.					
NOTE	5: 1. CB = 4x6-in		100	СВ							

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly viryl chloride. 6. Odor characteristic of manufactured gas plant waste.

									Borehole Log/Well Construction		
Mau	ıl Foster & A	loi	ngi,	Inc.	Project Number				Well Number	Sheet	
	1					8128.0	01.08	1	WS-14	9 of 11	
Depth (feet, BGS)	Well		. >	s S	Sample Data				Soil Description	n	
th BC	Details	'val	Percent Recovery	Collection Method 👷	Number		Blows/6'	Lithologic Column			
Jepi feet		Interval	Perc	Soll	Vun	Name (Type)	3/01/	ithc Solu			
70				02			-	10			
178	00000000										
E'''	00000000									-	
Ē	00000000									=	
_1 <i>7</i> 9						PID = 0ppm.				_	
Ē	00000000					гід = орріп.				=	
_180	00000000									<u></u>	
E	00000000									<u> </u>	
181	00000000										
										1	
E 182	000000000									-	
-102	00000000	₽	80	СВ		PID - Oppm		120			
E	00000000		-			PID = 0ppm. WS14-W-182					
_183	000000000									<u>-</u>	
E	00000000									<u> </u>	
_184	00000000										
Ē	00000000										
E 185											
E	000000000										
Ē 106	00000000							535 ASS	185.5 to 186.5 feet: Sand (SP); gray; 10	0 % sand, fine; micaceous; trace	
<u>=</u> 186	000000000					PID = 0ppm.			fines; wet.		
F	00000000									grav: 35% fines low plasticity: 65%	
_187									sand, fine; wet.	gray, 55% illies, low plasticity, 65%	
Ē	00000000										
_188	000000000										
Ē	00000000								188.0 to 190.0 feet: SILT (ML); gray; 10	0% fines, low to medium plasticity;	
189	00000000								damp.		
F	00000000					PID = 0ppm.			@ 189.0 feet: 2-inch fine, sand layer.		
Ē 100	00000000										
<u>=</u> 190	000000000							mmin'		00% sand fine: micaceous: trace	
F	00000000								fines; wet.		
_191	000000000 00000000									_	
Ē	00000000									<u> </u>	
_192											
Ē	00000000		100	CB		PID = 0ppm.					
Ē 193	000000000										
E	00000000										
Ē ,,,	000000000									-	
<u> </u>	505050505 00000000									=	
Ę	00000000									<u> </u>	
195	00000000					DID O			105.0 to 106.0 feet 011.77.0 AND 704.70	emply FOO/ fines levels for the FOO/	
	000000000 00000000					PID = 0ppm.			195.0 to 196.0 feet: SILTY SAND (SM); sand, fine; wet.	gray; 50% iines, iow plasticity; 50%	
를 <u>19</u> 6	000000000										
4-17.	000000000								196.0 to 197.0 feet: SAND (SP); gray; 1	00% sand, fine; micaceous; trace	
197	00000000								fines; wet.		
%F.	00000000		90	СВ		WS14-W-197			197.0 to 198.0 feet: SILT (ML); gray; 10	10% fines, medium to high	
128- 147- 147- 147- 158-	00000000								plasticity; damp.	· · · · · · · · · · · · · · · · · · ·	
198						PID = 0ppm.		Hiiiiii		100% sand, fine to medium	
.DEC.						Jopini			micaceous; trace fines; wet.		
[ 199										_	
MF.										<u> </u>	
200											
GBLWC WAGINTWAPROJECTS/8128-01/WS14-17.GBJ	-S- 1 CR - 4v6-inc	h cor	harrol e	soil sam	nler ?	PID - Photo io	nizatio	n detector so	il head space reading in parts per million. 3. G	W = aroundwater sample dashed arabic	
5/:/ 0/:/									n nead space reading in parts per million. 3. G C = poly vinyl chloride. 6. Odor characteristic d		
<u>&gt;</u> ي											
N N											
ö											

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly viryl chloride. 6. Odor characteristic of manufactured gas plant waste.

#### WS14 Completion Details

Oregon Water Resources Department Well Start Card Number: 164731 Oregon Water Resources Department Well Identification Number: L67967

#### Boring:

0.0 to 69.0 feet bgs: 10-inch temporary, threaded steel, isolation casing. 0.0 to 110.0 feet bgs: 9-inch temporary, threaded steel, isolation casing. 0.0 to 135.0 feet bgs: 8-inch temporary, threaded steel, isolation casing. 0.0 to 210.0 feet bgs: 6-inch temporary, threaded steel, isolation casing. 0.0 to 210.0 feet bgs: 4x6-inch core barrel sampler.

0.0 to 1.5 feet bgs: flush mount vault and cement seal.

1.5 to 7.0 feet bgs: 1/4-inch Baroid bentonite chips hydrated with potable water.

7.0 to 104.0 feet bgs: bentonite grout slurry, 10.0 pounds per gallon. 104.0 to 106.0 feet bgs: 20x40 washed Colorado silica sand, secondary filter pack.

106.0 to 125.0 feet bgs: 10x20 washed Colorado silica sand, primary filter pack.

125.0 to 140.0 feet bgs: non-IPA coated, 1/4-inch bentonite pellets hydrated with potable water.

140.0 to 142.0 feet bgs: 20x40 washed Colorado silica sand, secondary filter pack.

142.0 to 161.0 feet bgs: 10x20 washed Colorado silica sand, primary filter pack.

161.0 to 210.0 feet bgs: non-IPA coated, 1/4-inch bentonite pellets hydrated with potable water.

NOTES:

			Geologic Borehole Log/Well Construction							
Mau	I Foster & A	longi, Inc.	Project	Numbe	er	Well Number	Sheet			
			8128	.01.08		WS-14	11 of 11			
Depth (feet, BGS)	Well Details	Interval Percent Recovery Collection Method	Sample Data   Jag   Name (Type)	Blows/6"	Lithologic Column	Soil Description	on			

#### Well WS14-125:

0.0 to 109.0 feet bgs: 2-inch diameter, schedule 40 PVC blank riser pipe. 109.0 to 124.0 feet bgs: 2-inch diameter, stainless steel wire wrapped screen, 0.010-slot.

124.0 to 125.0 feet bgs: 2-inch diameter, stainless steel sump.

#### Well WS14-161:

0.0 to 145.0 feet bgs: 2-inch diameter, schedule 40 PVC blank riser pipe. 145.0 to 160.0 feet bgs: 2-inch diameter, stainless steel wire wrapped screen, 0.010-slot.

160.0 to 161.0 feet bgs: 2-inch diameter, stainless steel sump.

NOTES:

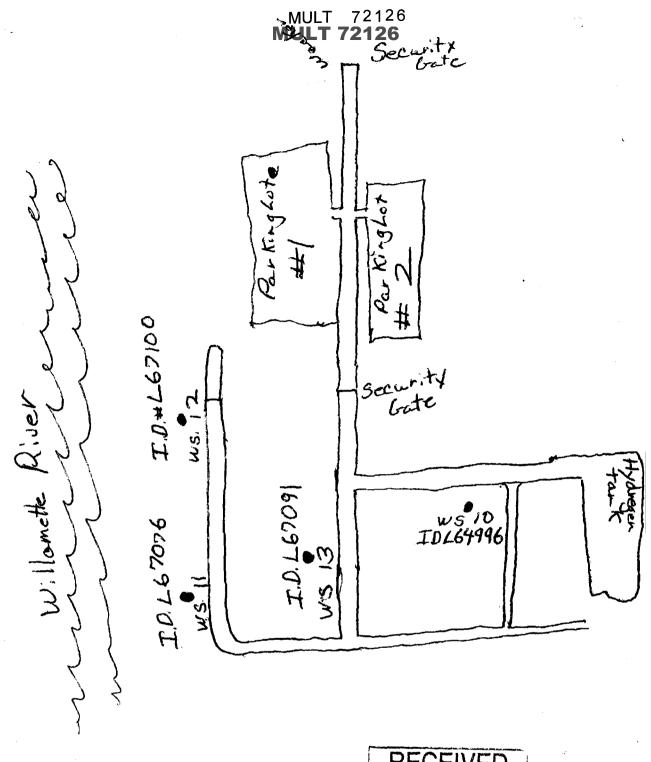
# ATTACHMENT C

**OWRD WELL LOGS** 



ONITORING WELL REPORT required by ORS 537.765 & OAR 690-240-095) structions for completing this report are on the last page of this form.	Start Card # 10147655
OWNER/PROJECT: WELLNO. //. S. / ]	(6) LOCATION OF WELL By legal description
ne Was Ker Siltronic Corpi	Well Location: County Multroman
he Wac Ker Siltronic Corpi hress 2200 N.W Front Ave.	Township / N or S) Range / W (E or W) Section /
Portland State Ov Zip 9/210	1. <u>SW</u> 1/4 of <u>SW</u> 1/4 of above section.
TYPE OF WORK:	2. Either Street address of well location 7200 NW  Front Ave Portland Or
New construction Alteration (Repair/Recondition)	or Tax lot number of well location 12.00
Conversion Deepening Abandonment	3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include
	approximate scale and north arrow.
DRILLING METHOD  Rotary Air Rotary Mud Cable	(7) STATIC WATER LEVEL:  27.4 Ft. below land surface. Date / D-20-0
Hollow Stem Auger Other Sen C	Artesian Pressurelb/sq. in. Date
	(O) WATER BEARING TONIES
BORE HOLE CONSTRUCTION	(8) WATER BEARING ZONES:  Depth at which water was first found
Yes No  and Standards \( \sqrt{\overline} \) Depth of completed well \( \sqrt{2.5} \)	ft. From To Est. Flow Rate SWL
Land su	ace 109 124 1.0 DEARW
Vault 2	REVEIVE
Fro Surface flush vaul	JUL 10.6. 200
Surface flush vault	JUL   0 6 200
Casing	(9) WELLLOG: Ground elevation WATER RESOURCE
GOD diameter 2	in. SALEM, OREGO
material P.U	Material From To SV
So S Welded Threader	
Seal Seal Seal Liner	Sakol Light Frown   BU
Seal Cool Liner diameter hon	
yD yD material	Sand Black with 52
70 Velded Threaded	
4 ft. 08 0 Well seal:	Basalt 203 203
Material Berlan	
00°00 Amount 1950	
Grout weight	0,0
Borehole diameter	
b D D D D D D D D D D D D D D D D D D D	er 3 ft shick
DO DO DO Screen	
Filter 08 0 material S+2.	DEC 1 0 2003
interval(s):	2 4 WATER RESOURCES DEPT
Total Ducas Brom 109 To	SALEM, OREGON
5 ft. So y B So y B From To Slot size 10	in.
Tall South Filter pack:	
Material Sand	Date started 9-21-03 Completed 10-21-0.
7800 67800 Size 10-2-C	in.
L07' \ 3000 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(unbonded) Monitor Well Constructor Certification:  I certify that the work I performed on the construction, alteration, or
WELL TEST:	abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the be
Permeability  Bailer  Air  Yield  GPM  Flowing Arte  GPM	knowledge and belief.  MWC Number
Conductivity 576 USCO PH 643	Signed Date
Temperature of water 16.03 °F/C Depth artesian flow found	ft.
Was water analysis done? Yes No	(bonded) Monitor Well Constructor Certification:
By whom?	I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above.
Depth of strata to be analyzed. Fromft. to	ft. work performed during this time is in compliance with Oregon well construstandards. This report is true to the best/pf my knowledge and belief.
Remarks:	MWC Number C3 Signed 11111 ILLUM Date 2/2/04
	- A A A A A A A A A A A A A A A A A A A

STATE OF OREGON MONITORING WELL REPORT (as required by ORS 537.765 & OAR 690-240-095)  MULT	72126 2126 D# L67 D# Start Card # W 147 655
Instructions for completing this report are on the last page of this form.	Start Card # W 117 000
(1) OWNER/PROJECT: WELL NO.	(6) LOCATION OF WELL By legal description
Name Was Ker	Well Location: County hutroman
Address 2200 N. W Front Ave	Township / N (N or S) Range / W (E or W) Section / 3
City Portland State Dr 70,92210	15 ω 1/4 of _ 5 W 1/4 of above section.
(2) TYPE OF WORK: RECEIVED	2. Either Street address of well location 2200 N. W Front Ave Portland ov.
New construction Alteration (Repair/Recondition)	or Tax lot number of well location /200
Conversion Deepening Abandonment	3. ATTACH MAPWITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.
(3) DRILLING METHOD SALEM, OREGON	(7) STATIC WATER LEVEL:
Rotary Air Rotary Mud Cable	27.9 Ft. below land surface. Date 10-20-03
Hollow Stem Auger Other	Artesian Pressure lb/sq. in. Date
BORE HOLE CONSTRUCTION	(8) WATER BEARING ZONES:
Yes No	Depth at which water was first found
Special Standards 💢 🔲 Depth of completed well ft.	From To Est. Flow Rate SWL
Land surface	145 160 .75 27.9
Vault (2)	
ft. Share tight cover	
Surface flush vault	
1,5 ft.	
Casing	(9) WELL LOG: Ground elevation
L. GRO diameter in	1.
well 1.5 Bood material P. J. C.	Material From To SWL
to 125 South South Welded Threaded Glued South X South	10P 50il 0
10,25 0000 0 0 000 0	Sand Light Brown 1 30
	Sift with Laxers 30
Seal 500 Liner diameter none in	1. 075 and 52
80.80 material	Sand Black with 52
Welded Threaded Glued	Vaxer's of silt 182
0800 0 0	Silty Grave 187 203
140 ft.   60 6	, Basalt 203 207
Material Bento at elio	
00°00 Amount 200 163	
Grout weight 10.0	
Borehole diameter	
in.  Bentonite plus at least 3 ft. 1	
	thick
3D 3D Screen	Well was Back Hilled with
	3 coated Benjorite pellets
$\bigcirc$   $0.50$ $\bigcirc$ $\bigcirc$   $0.50$ $\bigcirc$ interval(s):	From 161 to 207
740t. 30003 B0003 From 145 To 160	
70 〈 「ひょり 目 「ひょり FromTo	
/61 ft.   ₩ 0 ₩	
Filter pack:	
A COOL Filter pack:  O COOL Material Sound	Date started Completed 10-21-03
<u></u>	<ul> <li>(unbonded) Monitor Well Constructor Certification:</li> <li>I certify that the work I performed on the construction, alteration, or</li> </ul>
(5) WELLTEST:	abandonment of this well is in compliance with Oregon well construction
Pump Bailer Air Flowing Artesian	standards. Materials used and information reported above are true to the best
Pump Bailer Air Flowing Artesian Permeability Yield GPM Conductivity 45/ US/CM PH 6.6/	knowledge and belief. MWC Number
Conductivity 45/ US/cm PH 6,61	Signed Date
Temperature of water <b>45.27</b> °FC Depth artesian flow found f	it.
Was water analysis done? Yes No	(bonded) Monitor Well Constructor Certification:
By whom?	I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All
Depth of strata to be analyzed. From ft. to ft	t. work performed during this time is in compliance with Oregon well construction
Remarks:	1
	MWC Number
Name of supervising Geologist/Engineer Man Fater & Along	SignedDate
ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMEN	SignedDate NT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER



### RECEIVED

DEC 1 0 2003

WATER RESOURCES DEPT SALEM, OREGON

#### **MULT 72126**



### Water Resources Department

Commerce Building 158 12th Street NE Salem, OR 97301-4172 503-378-3739 FAX 503-378-8130

 $V_{i,j}^{(i)}$ 

September 2, 2003

MARK KNOLLE #10437 C/O PROSONIC CORP 305 E. COMSTOCK DR CHANDLER AZ 85225

#### FINAL ORDER

Dear Mr. Knolle:

The special standard request you submitted for owner: Wacker Siltronic, start card numbers 147653-147655 is approved for the following: multiple completion wells, the wells will have two (2) 2 inch wells in each borehole. See Oregon Administrative Rule (OAR) 690-240-0410(5). Your special standard request form is enclosed.

The Well Construction Standards serve to protect ground water resources. By approving and issuing this special construction standard the Oregon Water Resources Department is not representing that a well constructed in accordance with this condition will maintain structural integrity or that it meets engineering standards. The well constructor/or landowner is responsible for ensuring that a well is constructed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240.

If you have any questions concerning this letter, I may be contacted at (503) 378-8455 ext 283, or by e-mail at tracy.l.eichenlaub@wrd.state.or.us.

Sincerely.

Ms. Tracy Eichenlaub

Well Construction Specialist

**Enforcement Section** 

enclosure

cc: Dorothy Pedersen, NW Region Monitor Well Inspector

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review of the order must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137.004-0080 and OAR 690-01-0005 you may either petition for judicial review or petition the Director for reconsideration of this order.

#### **MULT 72126**



Water Resources Department

Commerce Building 158 12th Street NE Salem, OR 97301-4172 503-378-3739 FAX 503-378-8130

October 6, 2003

MARK KNOLLE #10437 C/O PROSONIC CORP 305 E. COMSTOCK DR CHANDLER AZ 85225

#### **FINAL ORDER**

Dear Mr. Knolle:

The special standard request you submitted for owner: Wacker Siltronic, start card number 147655 is approved for the following: use of bentonite below 50 feet and through more than 25 feet of water, 3/8 inch bentonite pellets will be used to abandon the bottom of the hole from 206 feet to 160 feet. See Oregon Administrative Rule (OAR) 690-240-0475(3). Your special standard request form is enclosed.

The Well Construction Standards serve to protect ground water resources. By approving and issuing this special construction standard the Oregon Water Resources Department is not representing that a well constructed in accordance with this condition will maintain structural integrity or that it meets engineering standards. The well constructor/or landowner is responsible for ensuring that a well is constructed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240.

If you have any questions concerning this letter, I may be contacted at (503) 986-0851, or by e-mail at tracy.l.eichenlaub@wrd.state.or.us.

Sincerely,

As. Tracy Eichenlaub

Well Construction Specialist

**Enforcement Section** 

enclosure

cc: Dorothy Pedersen, NW Region Monitor Well Inspector

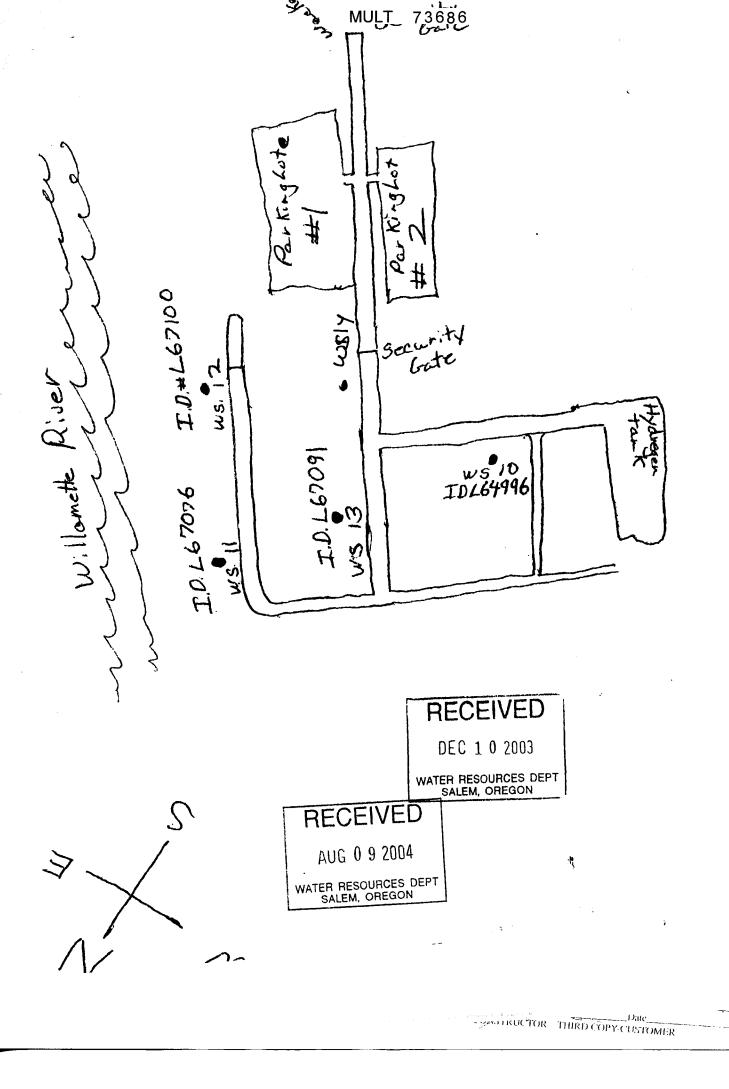
This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484.

Any petition for judicial review of the order must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137.004-0080 and OAR 690-01-0005 you may either petition for fluidial review of period the Director for reconsideration of this order.

OCT 0 9 2083

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MONITORING WELL REPORT (as required by ORS 537.765 & OAR 690-240-095)	Start Card # 1104731
Instructions for completing this report are on the last page of this form.  (1) OWNER/PROJECT: WELL NO. (1)	(6) LOCATION OF WELL By legal description
Name Siltronic Corporation	Well Location: County
Address 7200 NW Front Ave	Township (Nor S) Range (E of W) Section (3)
City Par Heunel State OR Zip 97210	1. 1/4 of 1/4 of above section.
(2) TYPE OF WORK:	2. Either Street address of well location 7200 NW Front Ase
New construction	or Tax lot number of well location 1200
Conversion Deepening Abandonment	3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.
(3) DRILLING METHOD	(7) STATIC WATER LEVEL:
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Hollow Stem Auger	NOW TIND SUFFERED
Hollow Stem Auger Other Solv	Artesian Pressure Wsq. in. Date
(4) BORE HOLE CONSTRUCTION	(8) WATER BEARING ZONES:
Yes No	Depth at which water was first found
Special Standards Depth of completed well 16.	From To Est. Flow Rate SWL
Vault 2	
ft.   G   Witer-tight cover	NOTORSERVED
Surface flush vault	
1. O Locking cap	(9) WELLLOG: Ground elevation
diameter 2 2 in	n Material From To SWL
welded Threaded Glued	Sand Grands 0 40
Description Description	sanc 40 acht
Seal Seal 2 Dog Liner	Busalt 204
A GLeft. DO ST Diameter in material	0.
Welded Threaded Glad	Neskelwell Special Standard
110 145 9000 2 2000 0 0 0	Request on file.
— II. Good Well seal: Material Benton's	Drilled well to 204 back-
POOC Anoun access 40	
Grout weight 9,7	8041 to 1(e)
Borchole diameter	Beologith 1/11/204
Bentonite plug at least 3 ft. t	
Filter gg	TILOLIVLD   72 TI
pack 800 material 100 material 200 material	ΔΙΙΕ Ο 9 2004
145   1900   E 1900   From   11 To 126	700 0 0 2004
124 170 \ 5000 E 5000 From 146 to 161	WATER RESOURCES DEPT
Slot size 1010 in.	SALEM, OREGON
Material Scan C	Date started (03) 04 Completed 7 8 67
ega	
	(unbonded) Monitor Well Constructor Certification:  ———————————————————————————————————
(5) WELLTEST:    Pump	abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best
PermeabilityYieldGPM	Signed Lef Strates Date 18107
Conductivity PH	
Temperature of waterft  Was water analysis done?	(bonded) Monitor Well Constructor Certification:
By whom?	I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All
Depth of strata to be analyzed	work performed during this time is in compliance with Oregon well construction
Remarks:	standards. This report is true to the best of my knowledge and belief.  MWC Number / C24/
Name of supervising Geologist/Engineer	Signed Date 124 47
ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMEN	T SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER



## ATTACHMENT D

VIDEO LOG OF WS-14-125 AND WS-14-161 (DVD)

